The Builder.

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ILLUSTRATIONS.

New School for the Rev. James Hepworth, York.—Mr. H. Nathan Smith, Architect 102
Vienna City Railways: Design for Central Station.—Mr. Joseph Fogerty, C.E., Architect 104, 105
The Palace of the King Don Pedro, at Seville; Principal Façade 106, 107
Raised Flock Paper.—Designed by Mr. G. C. Haite 111

CONTENTS.

An Important Economy to be effected by the Builder 91
The Earliest View of London 92
Richard Caway and the Cartoons of Giulio Romano 93
The Comfort of the Railway Passenger and the Interest of the Railway Shareholder 93
A Contemporary Sketch of Isambard Brunel 94
British Archæological Association 95
The Artistic Treatment of Constructional Ironwork: Royal Institute of British Architects 96
Builders, Spare our Trees 97
Liverpool Engineering Society 98
Smoke Abatement in the Fourteenth Century 98
Suggestions for the Conduct of Architectural Competitions 98
The St. Paul's Institute and Liberal Club, Burton-on-Trent 99
The International Electrical Exhibition 99
The German Government and Architecture 99
The German Parliament House 99
Sheffield School Board Competition 99
Principal Façade of the Palace of King Don Pedro, Seville 100
New School for the Rev. Jas. Hepworth, York 100
Raised Flock Papers 100
The Central Station of the Vienna Circular Elevated Railway 100
Architectural Inconsistencies 113
Supervision of Public Buildings Abroad 115
Obituary 115
The Chambers and Offices Company 115
Milford Docks Railway and Pier 115
Building Patents 116
A National History Gallery 116
Invaded by Ants 116
The Use of the Hyphen in Compound Words 116
The Smoke Nuisance 117
Heat 117
Skilled Labour and its Tools 117
Compensation Case: Gaylet v. The Vestry of Kensington 117
Injunction to Stop Erection of New Wall in front of Party-wall till it had been repaired: Phillips v. The First Avenue Hotel Company 118
Stained Glass 118
Church Building News 118
Books: Tomlinson's Level of Hatfield Chase and Parts adjacent; Woolnough's Whole Art of Marbling 119
Variorum 119
Protection from Fire 119
Miscellanea 119

An Important Economy to be effected by the Builder.

THE English builder loses from 90 to 180 days out of the 365, one year with another, from the vicissitudes of the climate. The very irregularity with which heavy rain at one time, and hard frost at another, interrupts his outdoor work, is a source of cost and loss. If the seasons arrived with anything like the exactitude on which it is possible to count in some parts of the world, it would be possible to arrange a programme of the work of the year in such a manner as to suit the seasons. As it is, this is impossible. But the question is worthy of attentive study, how far it is practicable so to arrange the execution of important works as to prevent on the one hand cruel waste of time, and on the other hand permanent disfiguration, or even more serious damage, to structures left exposed while unfinished to the capricious fury of the elements.

A stranger to England who should be taken to see the progress of some important national or private work would naturally come to the conclusion that rain was either an unknown phenomenon in the country, or that it descended at such regular and well-known intervals as to allow of the arrangement of out-of-door work in such a manner as to avoid exposure during the rainy season. How far this is from being the case we are but too well aware. The morning journals give us some shrewd guess as to the dry or wet character of the day on which they appear. A little study of the weather maps which some of them print, and of the warnings sent from that mother of depressions, America, allows the guess to be prolonged for three or four days, with some plausibility. And this is all. How many wet days will there be in a year, and how these days will be distributed, is a matter as to which no sensible man can form any reliable opinion beforehand. We may have, and sometimes do have, a month or two without rain. We can remember seasons in which, in some parts of England, it seemed to rain for nine months continuously.

It is, when we come to think of it, a very remarkable thing that the architect has not gravely contemplated this state of things, and set himself to meet the difficulty. We cannot, of course, pretend to speak exhaustively, or to say that what we are about to suggest may not have been considered and acted upon before now, with comfort and advantage. But if such be the case, it is only the more remarkable that there has not been some general and authoritative utterance upon the subject. A tolerably long and familiar acquaintance with public works has led us to regard the interruption of out-door work by wet weather as occurring, not indeed, with the predicted regularity of an eclipse, but with as little idea of human prevention as if the meteoric changes of our climate were distant astronomical phenomena. Is this all that science and civilisation can effect in this matter for the builder?

A week or two ago the writer of these lines was in the city of Oxford. In the new schools, a noble building, now almost complete in the exterior, was to be observed a precaution, which is, to say the least of it, unusual. It, no doubt, was attended with appreciable expense, but it is an expense which was very wisely incurred. The long corridors, lofty halls, and stately staircases of this magnificent quadrangle are all warmed, by coils of plates, heated, we apprehend, by hot water, and radiating a very sensible and comfortable heat. The effect of this upon the conduct of the interior work is of the greatest advantage. Seasoned timber is not allowed to lose in a few weeks of neglect the quality which it has taken years to gain. Floors, and wainscots, and fittings are not exposed to damp that will cause them to warp. The cold, clammy damp which usually hangs within large unfinished buildings in the winter season, was altogether absent. The health and comfort of the workmen, no doubt, are thus materially cared for, and the excellence and durability of the work,—and in this case the architect is building not for a building lease, but for centuries,—are, we cannot doubt, increased in a ratio very much higher than that represented by the cost of fuel. As soon as the building is roofed in; it is thus rendered, not only habitable, but in a sense inhabited, and we have little doubt that the health of the inmates will hereafter be the better for the coals that were thus burnt while the house was in building.

At another point in the same ancient and famous city rose a row of scaffold-poles, like the masts of vessels in the Pool, supporting platforms and ladders, and a busy throng of workmen. The sharp clink of the trowel was audible; the masons, and bricklayers, and labourers swarmed like bees at the door of a hive. All was industry; and the building grew slowly beneath the eye. Night fell on the busy scene. With morning light came no sounds of awaking, except the cry of a dolorous cock, echoed by the jubilant quacking of a brood of ducks, brought up by hand, unprovided with their proper playground of a pond, and clamorously thankful for the supply of water which Nature sent them. Not a man was at work. It was not Sunday; there was no strike. The straight-backed workmen that lounged dolorously along the streets had on their faces the expression of misfortune—not that of resentment. It seemed as natural to them to lose their day's work because it rained as it did to the poor water-famine-stricken ducks to rejoice at the same event. Were not the labourers as ill-used as the ducks? Would it not have been far more easy to provide them and their work with a temporary cover than it would have been to dig a duck-pond in the garden?

There was the row of scaffold-poles; there the empty scaffolds; there the unfinished, interrupted work, steadily soaking in all that the sky sent it, to the permanent detriment of the structure. It may be the case that the ancient school of learning might have held that the particular structure in question would not be likely to be required for its present destination for so long a term of years as to make it necessary, *condere in æternum*, to build for ever, but that is neither here nor there.

Why, was the thought that occurred to the mind, should not those two end scaffold-poles have been made rather longer and stronger than the intermediate row? Why should not a boom, yard, or ridge pole have been slung between them, fitted with ropes and pulleys, so as to have been lifted, each day, in proportion to the rise of the wall? And why should not a sheet of tarpaulin, or of prepared canvas, like the roof of a marquee, have been thrown over that boom and pegged down by gyes or shrouds? Half an hour's work by two or three men would have been enough to rig up the canvas roofing in the morning; and beneath its shelter who would have cared whether it rained or shined?

There may be cases where work is so scattered and so slight as to render such a provision as is above suggested too cumbrous to be altogether desirable. Such, probably, will be the case with the work of the jerry builder. But the instance above cited, which is by no means an imaginary one, may be taken as typical of a large amount of the best kind of building. Where an edifice is of sufficient size to employ ten or twelve workmen on one face, or one compact portion, we can see no reason why the protection of both men and building from steady downpour should not be made as integral a part of the arrangements as the erecting of the scaffolding itself. What is the objection? What the *per contra*? Let us regard it first from the workman's standpoint. To him such an aid would simply mean assurance against bad weather. Is it easy to compute the value of this assurance to the workman? Let us take a skilled mason or bricklayer who earns, for the sake of argument, let us say five shillings a day. One year with another it might save him 25*l.* per annum to be rendered independent of the arrest of his work by rain. Twenty-five pounds of pure gain in his pocket! For he must eat on these wet days. His rent, the cost of his clothing, of his fuel, all the contingent expenses of the year, go on alike be it wet or dry,—or rather are somewhat more when it is wet. More fire is needed to warm the damp air, to dry the wet clothes,—to warm the body

that is not kept warm by profitable labour. And the beer-house presents a stronger temptation on a wet day than on one of brisk employment. All round we cannot reckon that the workmen employed in the building trades would save less than from 25 to 30 per cent. of their time,—that is to say, would increase their net annual earnings by no less than from 25 to 30 per cent. by being rendered independent of the weather.

To the master-builder the gain would not be as large as to the workman, but it would still be considerable. If his accounts were so kept as to enable him to distinguish the cost of out-door and in-door work, he would soon be able to form an estimate of the increased profits that he would ensure by taking steps to set the weather in some degree at defiance. On all his capital invested in appliances for the execution of the former he would save from 25 to 33 per cent. of the annual interest and depreciation. On his office expenses, as far as they could be apportioned to this part of his trade, he would save from a third to a fourth, as staff and outlay that could keep all things in order in fine weather, can be only partially occupied when work is stopped. Nor is the certitude with which he would be able to calculate on the rate of progress that he could command, in itself, other than an element of profit. Again, in the distribution of both work and workmen, a great advantage would be effected. It is by no means over-stating the case to estimate that the master-builder would effect a saving of from one to two per cent. per annum on the capital employed in his business by taking wise and efficient steps for the protection of work in progress from weather.

The saving of vexation and anxiety to the architect would be no less palpable. Punctuality in the completion of work would thus be commanded, and the need of putting on a large number of strange workmen at a pinch would be avoided. The excellence of the work would be appreciably greater if it were carried on without interruption, and if that soaking of the water, from which some materials never wholly recover, could be altogether prevented. And if with this protection of the work before roofing-in, be combined that care in keeping dry and warm the interior of the building, from the time when the roof was complete, to which we have before referred, the gain to the excellence, durability, and habitability of the building would be great. And in this part of the case directly, as in the whole of it indirectly, the interest of the owner and future occupier is at one with that of the working-man, the master-builder, and the architect.

THE EARLIEST VIEW OF LONDON.

THE Society which has been formed under the title of the "Topographical Society of London," the object of which is to illustrate the history and topography of the capital, has just issued to its subscribers the first instalment of its publications in furtherance of this object, in the shape of the first half of a *fac-simile* of the oldest known view of London. The whole drawing will be complete in seven sheets, of which three, commencing from the eastern extremity of the view, are now issued, and the remainder are promised quickly.

The drawing thus brought out from its place of hiding in the Bodleian Library, and placed, by the aid of our modern processes of reproduction in *fac-simile*, within the reach of whoever may be interested in it, was made by an artist named Antonius van der Wynegaarde, somewhere very near the middle of the sixteenth century. It has been conjectured that he was a Fleming, attached to the court of Philip II., a conclusion which seems to be supported at least by the fact that his drawings out of England are at Rome, in Spain, and in the Netherlands. This, however, must, after all, be conjecture. The present drawing is not signed with any name, but those concerned for it are ready to vouch that it is obviously by the same hand which executed other drawings to which the name of Wynegaarde is attached. The original was bequeathed to the Bodleian by Mrs. Sutherland, and two copies of it by hand have been made, one for Mr. Crace, now in the British Museum, and one for the Corporation of London, which is in the Guildhall Library; but the present is the first real publication of the view. It has been reproduced by the Typographic Etching Company.

Mr. Wheatley, the secretary to the Topographical Society, is anxious to vindicate his Society's publication as the genuine "earliest view" of London, and disposes of four views of various kinds in the Crace collection, of earlier date, as being not in reality "views of London." We remember two at least of them, and concur in thinking that they cannot be called views of London: one gives a grotesque view of the Tower; another, an illuminated MS., gives what is probably on the whole a very fairly realistic view of Old London Bridge; realistic, that is to say, for a MS. of that kind. But these are obviously not views of London, and we may probably accept it that the one, the copy of which is before us, is the earliest delineation of London, in a general view, that has come down to us.

The three sheets now published extend from "Billens Gate" eastwards to Greenwich, the view being taken from somewhere in Southwark, —it is said, from Old Suffolk House, Southwark, "now" (1826) "the Mint." The perspective is, however, considerably exaggerated in regard to height of sight-line. The Thames cuts the view nearly in half longitudinally, the major part being on the lower or southern side of the Thames. This portion, constituting what one may call the foreground, is put in very sketchily, but with obvious attention to the real features of the scene. Opposite Billingsgate the site is tolerably crowded with houses towards the river, leaving, however, open fields and large trees in the immediate foreground; farther east, opposite the Tower, the houses become only one row of dwellings of irregular heights, mostly two-storied, adjoining the bank of the river; the remainder is open field with occasional trees; a farmhouse and outbuildings and a cart with three horses *tandem*, preceded by a man flourishing a long whip, are introduced in the immediate foreground; the farmhouse shows plainly a peculiar and well-known form of half-timber work with the struts cut into a serpentine shape. Beyond this, on the extreme right of the drawing, is seen the Thames winding through open country, and the picturesque, turreted buildings of old "Placentia," on the site of modern Greenwich Hospital, which are more carefully sketched than most of the buildings on the view. The perspective of the landscape here, however, is puzzling. Apparently from a determination to get the winding of the river complete into the view, the reaches southward, towards the spectator, are curtailed, and that northward, towards Blackwall, greatly extended, so that Blackwall, or a village in the distance which occupies that position on the bank, must be further away north than Bethnal-green. This latter place is, we imagine, represented by a distant village which stands higher on the paper (owing to elevation of the land) than our supposed Blackwall, though not so distant judging by the scale of the buildings. It shows a spire rising from the midst of a few houses.

Coming westward to the real object of the view, we find the Tower tolerably carefully and, on the whole, correctly sketched, comparing the sketch with the portions which still remain. The way down to the river, between the Tower and the east end of Lower Thames-street, evidently was in existence then, and faces us, running down, flanked by the western wall of the Tower precincts. On the Tower wharf are very plainly shown certain large cranes, presumably for hoisting stores and arms out of ships; and cannon are also dotted about, not in any regular order, but here and there, pointing in different directions. Behind the Tower is the open space so tragically notorious as "Tower Hill," or rather, behind the lower buildings of the Tower; the keep stands clear of it in the view. In the centre of the space is sketched what is evidently a permanent scaffold, with steps up to it, witness of a time when executions were of too common occurrence to allow of a scaffold being specially built up for each occasion. The eastward boundary of this space of Tower Hill is the old wall, which is seen stretching up the ground, following about the present line of the Minories, or rather, a little westerly of that street; a gate opens through the wall from Tower Hill to the exterior, with a small tower rising above it, and adjoining it, on the City side, a small enclosure planted with shrubs, apparently the garden of a gabled house which rises from the midst of the foliage. The position of this gate must be not far from the present site of Trinity House, but rather west of it. Outside the gate there seems to be a very sketchy and slight indication of a moat and bridge. Outside the wall, immediately eastward of Tower Hill, is the larger open space of ground which was then known as East Smithfield, the name still preserved in the street south of the Mint, skirting the St. Katharine's Docks; the lower portion of this space is now occupied by the Mint, and the upper end is known under the name of Goodman's Fields. On the east side of this space, somewhere about the west end of Royal Mint-street, is seen a cross, roughly sketched, surmounting some steps; and further up the space a triangular erection on the top of a post, which is probably a cage for the confinement of malefactors of a minor shade of guilt, as one is known historically to have existed here; an indication of a similar erection on Tower Hill is faintly traced. Eastward of this open space,—East Smithfield,—stretched a considerable belt of extra-mural houses, commencing about Aldgate and extending south-easterly down to the water, with several churches or chapels rising from among the houses. Here we find one of those instances, so often seen in the annals of cities, of a sort of continuity of history of sites, even under the greatest changes; for here, at the bankside, just about where "Steam Packet Wharf," adjoining St. Katharine's Dock, is marked on the modern map, is a wharf and something like a half-dock, from which the stems of one or two vessels protrude.

Going back to the city wall, we trace it easily up to Aldgate, where the square mass of the gate is conspicuous, crowned by several poles, nodding over in different directions, with little knobs on the top of each, which a nearer view would undoubtedly show to be human heads. A large cross church, which, by the shape of the angle-turrets of the tower and transepts, can be made out to be Late Gothic,—decidedly late,—stands just westward of the gate, the former parish church of Aldgate, not on the site of the present one, which is just outside the old line of wall. Just outside the gate is a church-tower, looking of older date, with a very conspicuous cross on each angle of the tower, which appears to be almost on the very site of the present parish church of Aldgate. To the right of this, the road, now Whitechapel High-street, is traceable for a little way, between rows of houses. Westward it is difficult to identify a good deal of the view. The wall is traceable throughout, following the lines of Houndsditch and London-wall; and the Bishop's Gate, and the lines of "Bishopsgate-street Within" and "Bishopsgate-street Without." The latter projects right out into open ground, between two rows of houses, terminating in a large church, the existence of which seems the *raison d'être* of the street. Over this church is written, "S. Maria Spital," this having been the hospital and priory of that name, which was disestablished at the Reformation, and when this view was taken must have been in little better condition than waiting till some one took the trouble to pull it down. That some special interest was attached to it just then seems probable from its being one of the few features in the view to which a name in writing is appended. The Priory, with its appurtenances, forms along the line of Bishopsgate-street Without the form of a T, of which the street is the stem, projecting out into the fields from the general mass of the city. To the left, in the shoulder of this T, is the space now occupied by the Broad-street and Liverpool-street Railway Stations, and the names of "Worship-street" and "Holywell-street," immediately to the north of this space, and close on the old site of the Priory, still tell of the former sanctity of the neighbourhood, now given over to the whistling of locomotives.

The lines of Fenchurch-street and Leadenhall-street can be traced in the view, but the former does not seem to be quite at the correct angle, nor is it easy to identify some of the churches, or their sites (where they have been rebuilt since the date of the view). The houses are mostly just roughed in, in such a way as to show which way their gables faced, and the numerous rather steep pointed gables give to the general view a very different appearance from that which a bird's-eye view of the same part of London at present would have, without taking into account the enormously increased size and height of the buildings for commercial purposes at the present day. The front facing the north bank of the river, however, is drawn, though roughly, with an apparent intention of showing all the main and characteristic features of the buildings, which makes this portion of the drawing very interesting. We see old Billingsgate

Market, with three large open arches and steps down from the quay, and two ships waiting to deliver or discharge cargo in a kind of inlet or basin just large enough to hold them, between the market quay and another long building with its gable end to the water. The odd rounded shape and high ends of the boats and ships are no doubt from reality, but we may probably take it that even at this period the Thames showed far busier life in the way of shipping than is indicated by the few craft dotted about in this view, and that as Wynegaarde's real object was to draw London, he omitted most of the ships and boats as troublesome items interfering with the view, and not necessary to it. This we take to be the explanation; for London business and the London market must have been "quiet" indeed in those days, if "Thamesis Fluvius," as the old maps delight to call the river, had been really as bare of craft as he is represented in this drawing.

But the picturesque variety of the river frontage is obvious from the drawing, and rough as is the draughtsmanship, we gather a good deal from it. We can trace some of the various methods of construction which the artist has, in his hasty manner, carefully indicated. We see the house with a large end archway towards the quay, and the outbuildings with lean-to roofs, and the house half covered with black and white timber work in cross diagonal bracing, and the other one with a line of similar work in rectangular "post-and-pan" running across the elevation between the upper and lower story; and another with two arches and a column between them, another with a large arch below and the windows above ranged in a regularly spaced row under the eaves: all these details are indicated sufficiently for us to fill them up with our mind's eye, and to see that there was plenty of work for the sketchers who might in those days have been on the look out for the picturesque of street or wharf architecture.

London Bridge is just missed in the sheets now published; it is very carefully shown in the original, and much else of interest may be looked for when the remaining four sheets which complete the view are published. Meantime we may make one suggestion as to the method of producing or mounting the separate sections. They are each mounted with a tolerably wide margin all round, so that it is impossible to put them together so as to make the whole continuous to the eye. This seems a mistake. The sheets should have been mounted with a margin at top and bottom only, or, at all events, with only a margin on one side of each, so that by means of overlapping we could get over the awkward intervening strip of white, and be able to see the drawing as a continuous one. It would be much more easy, in that case, to study it in connexion with the map of existing London.

RICHARD COSWAY AND THE CARTOONS OF GIULIO ROMANO.

THERE exists in France an excellent and not perhaps sufficiently well-known society, whose professed aim, as its title, "La Société de l'Histoire de l'Art français," would imply, is the special study of all points that may be connected with the history of French art. The field of its labours, though thus apparently limited, is agreeably extensive, and many are the discoveries, the inquiries, the corrections, and the facts which the members of the society are able to throw on the subject which forms the common bond of interest and research. The publication from time to time of the so-called "Archives" of the society places within the reach of what may be termed the outsiders, some if not all of the pleasant privileges of membership, and at least enable them to profit by the funds of information gathered by the various members of the society. A recently-published volume of these "Archives," brimful of scattered notices of little known and more famous artists, quaint artistic scraps gathered from the long-hidden and dusty sources of royal accounts, inventories, and such-like documentary sources hidden from the general gaze of the profane, and commending itself but in a small degree to the English reader, contains a curious account worthy attention of the presentation to Louis XVI. by Cosway, the painter, of the series of cartoons by Giulio Romano, which, it will be remembered by all visitors to the Louvre, form a conspicuous feature in the galleries devoted to the drawings of the old masters. Allan Cunningham, in his "Lives of British Painters," has, it is true, told the tale of the incident, but the latest contribution to the details, consisting in the publication of the correspondence exchanged on the occasion, is interesting, and to not a little extent instructive.

Cunningham relates how one day Cosway, having on a visit to the Louvre, then a half-deserted palace, remarked to his wife,—the beautiful Maria Cosway, who was to inspire so profound an admiration in the poet André Chenier,—on the bareness of the walls, bethought him of the Giulio Romano cartoons in his possession. He offered them to the King of France, who accepted them, presenting to the painter not long after four superb pieces of Gobelins tapestry, scenes from Don Quixote by Coypel, together, so we learn, with a complete copy of the "Estampes du Cabinet du Roy." Such are the related facts as to how Cosway's cartoons came into possession of the French Government. The contributor of the correspondence on the subject of Cosway's cartoons, M. Guiffrey, takes upon himself to doubt the entire accuracy of the statement; from another letter contributed by him to the Society's archives, he points to the fact of a previous offer of the cartoons to the French Government, when they were refused; from this and other circumstances, M. Guiffrey would wish to imply that Cosway, finally being unable to sell his troublesome possessions, had determined to present them to the French king, going to Paris to follow the negotiations. It is pleasant to find that this unflattering view of the charming painter's generosity can be proved to be incorrect. M. Guiffrey is certainly able to clear up one doubtful point left by the able *conservateur* of the pictures in the Louvre in his account of the cartoons. It would be interesting to know, asks M. Reiset, how these works came into the possession of Cosway. Preserved until 1631 in the ducal palace at Mantua, for which they were prepared, they were carried at that date by the Imperials to Venice; there they remained till the end of the last century, where they were purchased by an English gentleman, who, however, on his return home, finding the cartoons too large for his gallery, parted with them to Cosway.

The first letter of the published correspondence is one from M. d'Hancarville to the Comte d'Angivilliers, stating to him that Cosway, after seeing the magnificent Sèvres vases and other objects for the embellishment of the Museum, which was then being formed, and struck by the grandeur of the idea and the good that would come of it, "asks you to present to the king four cartoons worthy to be offered to him, as uniting the powers of Raffaelle and Giulio Romano." These are the cartoons which now hang in the Louvre, after having passed through an odyssey of adventures well told in the Louvre catalogue (Dessins, &c.). The passage in the letter which follows is, we think, particularly noticeable, as bearing on the question of the impugned generosity of Cosway:—"No sum would be capable of obtaining these works from his hands, for he enjoys a considerable fortune; he is a great connoisseur, and so far from desiring to get rid of any object, he daily augments his collection by pictures and drawings. He tells me that if the Prince of Wales, to whom he is attached, or the King of England, possessed a collection like that of the King of France, and made so good a use of it for the public advantage, he would believe himself obliged to make the same offer to him as to his majesty. Nothing is more disinterested than his offer, for he would refuse any recompense or advantage. His ambition is to contribute to the good of the arts. He himself is a very distinguished artist, a member of the Royal Academy of London, and first painter to the Prince of Wales. The step of M. Cosvai [*sic*] is a homage," continues the writer, "which strangers render to the king, whose broad views for the advancement of art are applauded by the whole of Europe. It is to be the benefactor of the world to encourage the arts, as they contribute to unite all nations which political interest renders unfriendly. Such interest sometimes produces heroes; but a taste for the arts, by softening the manners, makes men, and men are certainly worth heroes. Continue to encourage these institutions, so useful to the public welfare; they augment the glory of the king, the reputation of France, and that of our century, which has great need of such means to be the equal of that which preceded it."

The second letter is a copy of that sent by the Comte d'Angivilliers to Cosway, "first painter of his Royal Highness the Prince of Wales," and dated September 5, 1786. After acknowledging the receipt of Cosway's letter, the writer breaks into praise of the donor's generosity,—"It would be impossible to give a more noble proof of his love for the arts than a sacrifice of this nature." The letter the Count gave to the king, who, he assures Cosway, asked him (the Count) to express to him (Cosway) his utmost gratitude. "It would be desirable," continues the Count,—and the view he takes is one interesting to see expressed a century ago, but the truth of which still remains too little understood,—"it would be desirable that all those who possess beautiful objects should make as noble a use of them by enriching great national collections. It is procuring their enjoyment for all nations, it is establishing a bond between them." After a polite acknowledgement of thanks for the pleasure it gives him to negotiate the affair, and a hope that the time may approach when "all such possessions may become a common enjoyment for all those who love and cultivate the divine arts," the letter closes with a compliment to "Madame de Cosway's [*sic*] talents."

These are the two letters contributed to the "Société de l'Histoire de l'Art français" by M. Guiffrey, whose views of the doubtful generosity of Cosway in presenting the cartoons is, however, we are happy to see, warmly disputed by so able an authority as the *conservateur* of the Louvre picture-gallery, M. Reiset, in a lengthy note inserted at the end of the volume of the "Archives" from which we have gathered the facts of this paper. In the first place, M. Reiset very properly doubts that the reference in the first instance to cartoons by Giulio Romano having been offered to, and refused by, the French king, relates to those eventually presented by Cosway; the curator of the Louvre opines that these other cartoons are a series, very far inferior to Cosway's, which, as he tells us, have for eighty years past been periodically offered to the Louvre every five or ten years.* To M. Reiset the story told by Allan Cunningham appears in every degree trustworthy; how otherwise, if Cosway had been merely desirous to rid himself of troublesome property, would the Comte d'Angivilliers have spoken in terms of such gratitude in his letter to Cosway on the subject of the present, which, as M. Reiset truly says, was "superb"?

It only remains for us now, when we have lost the prize, to regret that there did not exist in Cosway's time a National Gallery where such works as these, which the painter judged us unworthy to possess, would have well taken their place with those other treasured relics of the great epoch of Italian art, the Raffaelle Cartoons at South Kensington and the Mantegna *tempera* pictures at Hampton Court, which it is to be hoped will, some day, at no distant future, be brought together.

THE COMFORT OF THE RAILWAY PASSENGER AND THE INTEREST OF THE RAILWAY SHAREHOLDER.

A CORRESPONDENT of a morning paper has called attention to the extraordinary difference in the character of the service rendered to London by the nine great trunk railways which radiate from the metropolis, both in charge and in speed. The latter varies by 33 per cent., from 36 miles per hour on the Great Eastern, to 48 miles per hour on the Great Northern. The rate of fares varies by 48 per cent., from 1·606d. per mile on the Midland, to 3·076d. per mile on the London, Chatham, and Dover. But there is no relation between higher fares and higher speed. On the contrary, the swiftest line, and the one, we may add, which has the severest gradients (with the exception of the Brentwood incline), is also the cheapest. The speed on the Great Eastern, the Brighton, and the South-Western lines is from 36 to 40 miles per hour; that on the South-Eastern, the London and North-Western, the Midland, the London, Chatham, and Dover, and the Great Western, from 42½ to 45½ miles per hour; and that on the Great Northern, as before stated, 48 miles per hour. We may add that of the three Northern lines, each locomotive on the Great Northern earned

* See a notice of these works, Louvre Catalogue, Dessins, &c.; Ecoles d'Italie, &c., pp. 239, *et seq.*

4,900*l.* per annum; on the Midland, 4,662*l.*; and on the London and North-Western, 4,146*l.* These rates of earning are not in the exact ratios of the speeds, but they are very close upon them. It must be remembered that the data with which we have to deal are extremely restricted. The inquiry is as to passenger traffic alone, and the whole system of accounts of all the English railway companies, as far as presented to the Board of Trade, is scrupulously contrived so as to prevent any useful information being obtained as to separate branches of traffic. Again, the writer whose figures we cite has given the speeds in such a manner as to be most instructive to the passenger; that is to say, the actual time consumed between different points. But speed, as a matter of cost, depends, as far as consumption of fuel is concerned, on maximum running velocity, which is quite another thing. For example, on the Metropolitan line, the stations are so numerous that the net speed from terminus to terminus is less than a third of the running speed. In this case, then, both cost of fuel and cost of wages are at the maximum, or nearly so, and the total cost is increased by thus burning the candle at both ends. Probably the low average speed of the London, Chatham, and Dover line, cited by our informant as 42·617 miles per hour, is due to the large number of stations. On the other hand, the Great Northern quick trains run 76 miles from King's-cross to Peterborough without a check, and thus speed is an element of cheapness.

There is, however, a reason for the difference of fare which has escaped the writer in the *Times*. The lowest fares are those on the Midland, the Great Northern, and the London and North-Western lines, which are respectively cited at 1·606d., 1·756d., and 1·835d. per passenger per mile. But this is a case of keen rivalry, and the mileage rates are evidently arrived at by fixing equal charges for conveyance to the same places by the different lines, the difference in the lengths giving a slight difference in the cost per mile. On the other hand, the London, Chatham, and Dover, and the South-Eastern, have not allowed their rivalry so far to make them lose sight of the main chance as to come down from the maximum legal fare. By the first, 3·076d. per mile is charged for 78 miles; by the second, 3·157d. per mile for 76 miles. The speeds are 44·511 and 42·617 miles per hour respectively. Their given passenger earnings per train mile are 5s. 6½d. and 7s. 1½d. respectively; their earnings per engine, 5,790*l.* and 6,369*l.* per annum. Of the London, Chatham, and Dover traffic, 67 per cent., and 70 per cent. of that of the South-Eastern, is derived from passengers. The working expenses per train mile are 39·3d. and 41·9d. respectively. But the net receipts (according to the Index to the Railway System) are only 2s. 7d. per train mile on the first, against 3s. 10½d. per train mile on the second. It is possible that by calling attention to these somewhat anomalous figures we shall elicit information from some one familiar with the working of the two lines in question which may elucidate the subject. What we have now to urge is, first, that reduction in fares is at present to be looked for from competition alone, as it seems to us; and, further, that such competitive reduction, however grateful to the public, is matter of very short-sighted policy on the part of the railway managers. The receipts per passenger train on the three northern lines could be raised from 4s. 6d. to 6s. 3d. per mile but for the permanent reduction due to the policy of the Midland.

The French Government, it is said, are now calling on the railway companies to reduce their fares by 50 per cent., and their freights by 20 per cent. The mean of French fares and freights is given by M. de Franqueville as 1·06d. per passenger and ·95d. per ton per mile, against 1·292d. per passenger, and 1·08d. per ton per mile in England. As our working expenses are some 54 per cent., and as the balance of 46 per cent. of revenue only pays 4¼ per cent. on capital, it is obvious that any such proposal in England would mean something like extinction of dividend. But is it not a subject for serious consideration to inquire why the French railways have been so managed as to become a property so superior to our own in value, that the question of such a reduction, as an alternative to being bought by the Government, on the terms provided for in the original concessions, should be for a moment thought worthy of discussion? Since the above was written it is stated that one of the great French lines has agreed to make the abatement in question.

A CONTEMPORARY SKETCH OF ISAMBARD BRUNEL.*

IT is now nearly a century and a half since the rising commerce and manufactures of this country, accompanied by and dependent upon the rapid opening up of its mineral fuel, called into existence the profession of the civil engineer, and during that period, as from time to time the circumstances of the country have demanded works of magnitude and skill, men fully equal to the occasion have risen up for their construction. France, during the reign of Louis XIV., was far before England in her roads, canals, ports, bridges, and quays, but that pre-eminence was rudely threatened when Smeaton, the founder of the English profession, constructed the lighthouse on the Eddystone, and was completely destroyed as arose in rapid succession Brindley, whose name is associated with our earliest and greatest canals; Telford, who brought to perfection our turnpike roads, and who spanned the Severn and the Dee and the Menai Straits with those marvellous bridges, the two former the largest arches then constructed in England, and the latter a bold assertion of the new principle of suspension; Rennie, the great dock engineer of his day, and the constructor of Waterloo and designer of London bridges; George Stephenson, the father of the railway system and the engineer to a work long pronounced impracticable, the Liverpool and Manchester railway; Robert, his gifted son; Brunel, the inventor of the block machinery and the engineer to the Thames Tunnel; and, finally, Isambard Brunel, whose name closes this brilliant roll, and whose life, recorded by the piety of his son, is now (1870) given to the world.

Of the great men enumerated above, each was distinguished by the attribute of original genius. There have been and are others, engineers of great merit, who have executed very considerable works; but no engineer can be counted in the highest rank of his profession who does not largely possess that inventive faculty without which a claim to genius can hardly be substantiated. Nearly all these men, Smeaton, Brindley, Telford, Rennie, and Geo. Stephenson, were self-taught; the four latter rose from the ranks, and won their way to knowledge and to eminence by slow and severe labour. Robert Stephenson and Isambard Brunel were perhaps still more severely tried, for they were, especially the latter, by the accident of birth, placed early in life almost in the position attained by their parents towards its close,—a position highly favourable to the establishment of a respectable mediocrity, but much less likely to elicit those qualities and that industry without which the highest places are not to be attained.

A man who has not executed great works can scarcely be a great engineer; but the reverse of the proposition is by no means so generally true. The founders of the profession had to employ materials, sometimes novel, but always to resist strains and pressures of a nature to which they had not before been subjected, and their originality was shown in the way they met and overcome these difficulties. By reason of the experience of the past, the present race of engineers are but seldom called upon to exercise such qualities. After Telford's bridge the application of the suspension principle was a mere matter of calculation. After the tubular bridges of Conway and the Menai, and those of mixed construction over the Wye and the Tamar, any contractor could erect tubular bridges to order, and in criticising the great works by which the metropolitan railways are conveyed across the Thames, our praise or blame is confined, or nearly so, to their architectural or ornamental merits, while their engineering qualities, their power to resist strain, is taken for granted as settled by ordinary calculation; nobody asks by whom they were designed.

Isambard Brunel inherited from his father a great fertility of invention, remarkable quickness and accuracy in calculations of all sorts,—what he himself called "a mechanical mind,"—powers of steady persistence, and an excellent temper. To these he added a far greater measure of worldly prudence, more knowledge of men, and a turn of thought more strictly practical than that of his father.

There are now but few remaining who knew the elder Brunel at all intimately, nor does Mr. Beamish's account of him unfold, to any great extent, his peculiarities of character. Of the world with which he had had so much to do he remained to the last exceedingly ignorant. His simplicity, out of his profession, was childlike. A true Frenchman in his sunny temperament and his enjoyment of conversation, the garrulity of old age led him to delight in stories of his own very remarkable career. He liked to tell how, when a boy in the French navy, he constructed his own quadrant; how, when he reached New York, he built a theatre, now burnt down, and laid out a line of canal with a level, an instrument he saw on the field for the first time; how, when he landed in London, he sauntered under the archway of Somerset House, little thinking that some day he was to sit as vice-president in the great scientific society whose rooms were above it; how he devised a machine to enable Lady Spenser to deal cards at whist, and another for the same lady for winding her cotton into balls. Very curious was his account of the difficulties both with men and matter that he had to overcome before he, a foreigner, succeeded in establishing his machinery in an English dockyard; how he made boots and shoes by machinery with most wonderful nail patterns upon the soles, at Battersea; and how the upholstery trade, with its narrow trade-union spirit, was too much for him, and would have none of his machine-made cabinet work, of which a charming specimen was the writing-table at which his son always sat. It was these little confidences that secured him the love and sympathy with the young and those about him, and which produced a character that, had his son been spared to relate it, would have been indeed a charming piece of biography.

The points of difference between the father and son were at least as distinctly marked as those of their resemblance: Isambard Brunel, with a frank, open manner, the very reverse of mysterious, was habitually reticent, and could keep a secret so well that no one would have discovered that he had a secret to keep. In his vocation as an engineer, Isambard Brunel confined himself to the matter in hand, while his father indulged in all sorts of curious illustrations. Both father and son would have calculated the pressure to be borne by the Tunnel Shield, its area and power of resistance, but the old man alone had discovered that its cross area was that of the then House of Commons, that so many men could march through it in a given time, that its length was such a fraction of the diameter of the earth, and so on. His journals and books of calculation, written in his clear minute hand, with the neatest of sketches illustrating what needed illustration, were, and doubtless still are, a collection of numerous and very curious observations.

The author of the biography has well attributed the real professional education of his father to the school of the Thames Tunnel. For a young engineer no better school could be found. Nowhere were there such opportunities for learning the quality and strength of materials, the best methods of so arranging them as to produce the greatest effect with the smallest quantity, their price or cost of production, and, not less important, how to manage men in the face of uncertain and rather appalling danger. In the yard above, the elder Brunel carried on all sorts of experiments in construction, while in the tunnel below the results were put into actual practice under a natural penalty so heavy upon error or negligence as materially to diminish the occurrence of either one or the other.

Nothing could exceed the invention shown in the tunnel works, from the brick tower of great height and large diameter, laden with its cross-acting steam-engines, and which, after it had reached its height, to the astonishment of beholders, was seen to sink gradually until it disappeared in the earth and became, what it still remains, the lining of the great shaft; from this, at one end of the work, to the complex and ingenious shield at the other, all was utterly unlike anything that had before been seen. Here, not less by his abilities and genial temperament than by the courage which he showed when the water broke into the works, Isambard Brunel gained the respect and affection of the tunnel workmen, of every one of whom he knew the character and qualities, and whom he never neglected when they came in his way in after-life. It was while engaged upon the tunnel that Brunel turned his attention to the capabilities of railways, then scarcely known, so that

* The following fragment, written long ago, was laid aside for some temporary reason, and never completed. It was accidentally met with a few weeks since, and we quite agree with the writer of it in thinking that many of our readers will find pleasure in the perusal of it.

when shortly afterwards he, as a very young man, met with the Great Western promoters, he was able to convince them that he had studied the subject profoundly, and was prepared to fight their battles before the Legislature and in the field.

It is difficult for those who do not remember those days to realise the dense ignorance that prevailed upon almost all engineering subjects, not only with the world at large, but in the profession. George Stephenson had adopted his colliery gauge for the Liverpool and Manchester Railway, empirically, because he found it in use elsewhere, and without a notion of the speeds that would be obtained upon it. In January, 1829, the directors employed Messrs. Walker & Rastrick, the two leading engineers of the day, to report upon the power to be employed upon their railway, then within a few months of completion. Their report, printed in that year and now scarce, is a very curious production. They assume a speed of not less than ten miles an hour, and consider three sorts of locomotive power, by locomotive engines, by stationary engines, or by horses, and this for a line at the opening of which, but a few months afterwards, a locomotive engine actually attained a speed of 30 miles an hour! Having no experience of high velocities, engineers knew nothing of the effect of curves, or the limit of gradients, or of the weight or method of supporting the rails. Brunel's early reports to the Great Western show, what his tunnel friends were well aware of, that he had studied these matters with care so far as they could be studied in the absence of direct experience.

Among the subjects experimented upon at the tunnel were two of very great interest. One was a plan for turning large brick arches without centreing; the other, the employment of condensed gas as a power. In the tunnel-yard was long to be seen a brick pier, from which projected 30 ft. in one direction a light half-arch of 60 ft. span, and in the other a shorter and heavier half-arch. The pier was built upon the ground, without foundation, and the two arches balanced. These arches were turned by the employment of Roman cement, and between each course of bricks were laid bands of various materials, from straw to hoop-iron, and thus the structure was erected without centreing, and stood without the support of the other half-arch. It was found in the experiments connected with this result that clean-picked split straw, if compressed into a bar, had greater power than wrought iron of the same section of resisting a rending force.

Upon the gas engine Brunel and his father bestowed much labour, unprofitable in its immediate results; but the conduct of the experiments was of the highest service, at any rate to the younger engineer. It is a curious proof of Wollaston's sagacity that, at the commencement of the experiments, when consulted as to the gas to be employed, he said, "Yes; carbonic acid is, of course, the most economical, but there is something about it that leads me to fear that when condensed it will be slow in expanding; and this while Faraday's experiments were in their infancy.

In 1829 Brunel competed for the Clifton Suspension Bridge, and sent in four designs, for spans of 760 ft., 1,180 ft., 890 ft., and 916 ft., the two latter being the designs he specially adhered to. The directors consulted Telford, who, curiously enough, called Brunel's plans pretty and ingenious, but thought the structures would eventually tumble down in a high wind. He thought no span was admissible that was greater than his own at Menai; that is, a little below 600 ft.; the directors therefore called upon Telford himself to provide a design, which he did, but it was not liked, and certainly, if executed, would not have added to his fame.

A second competition was decided upon, and Mr. Davies Gilbert being the judge, and having heard Brunel in explanation of his design, it was adopted. The work was not proceeded with for want of funds, but the piers were constructed and the drawings completed in great detail. They exhibit a number of new and very ingenious contrivances for stiffening the platform against high winds, checking the vibration of the ironwork, and for securing a more equable distribution of the weight, and the prevention of any lateral strain upon the piers, which were to be enclosed in a casing of cast iron, upon which were to be represented in relief the various processes of the manufacture of iron, from its reduction from the ore to the fitting or completion of the bars of suspension. This intention should be borne in mind as accounting for the bald and unfinished aspect of the piers as they now stand. The bridge, however, was not executed till after Brunel's death, and then with various modifications in the details. But what Brunel was capable of appeared in Hungerford Suspension Bridge over the Thames, built by him in 1845, a work of singular purity of design and of great engineering skill, having a main span of 678 ft., and two half-spans, of 343 ft. each. Unfortunately this bridge stood in the way of the Charing Cross extension of the South-Eastern Railway, and was replaced by the present Titanic structure, and the beauty of that part of the river has certainly gained little by the change.

The ability manifested in Mr. Brunel's designs, if lost upon Telford, was fully appreciated by the leading citizens of Bristol, who had also seen something of the young engineer then employed upon the works of the floating harbour. This led, in 1833, to his appointment as engineer to the Great Western Railway, then brought forward as a serious project. To this he at once devoted his whole attention. He made himself intimately acquainted with the country to be traversed, spent his days upon the ground and his nights in preparing the necessary details, and in travelling from point to point. He also organised a small but very able staff of assistants.

The public, however, was not as yet prepared to support the entire scheme, and in consequence application was made to Parliament for two lines, from Bristol to Bath and from Reading to London, thus omitting the intermediate portion, over which the line selected differed widely from that of the road then in use, and differed also in some important respects from that recommended by the engineer, which would have avoided the tunnel at Box, and the severe gradient, at that time supposed to be unworkable without the employment of assistant power.

Brunel's appointment as engineer to one of the principal railways of England radiating from London at once placed him in the foremost rank of his profession. All, indeed, could not judge of his skill as an engineer; but during the long and severely-contested battle before the committees of the two Houses of Parliament, he exhibited qualities which all were able to appreciate. By the clearness of his statements, his readiness and ingenuity in reply, his continual reference to principles in support of what many considered to be dangerous novelties, and by the overpowering strength with which he swept away the mathematical subtleties of Dr. Lardner, on whom the opposition mainly relied, he won the good opinion of the leading members of both Houses, of the Parliamentary bar, and of the principal commercial interests of the western counties. With this new phase of his career opens the second and principal chapter of his life. G. T. C.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

AT the fourth meeting of the session, held on the 18th inst., Mr. Thomas Morgan, F.S.A., in the chair, a large number of interesting exhibitions were made.

The first paper was by the chairman, on the subject of the Roman pavements found in Britain. After a review of various classical myths dwelt upon by the writers of the period, the lecturer proceeded to indicate that similar subjects were shown pictorially on the pavements in question, and that these subjects were almost always consecutive, so that if one or two were ascertained, the general scheme of the design might be recovered. The frequency of the subject of Orpheus on such pavements was referred to, and the principle was applied to the figures recently found at Norton Farm, Isle of Wight, in a manner to suggest several alterations in the designations given to them.

The second paper, on St. Agnes's Eve, by Mr. H. Syer Cuming, F.S.A. (Scot.), was then read. After reviewing all that is known of the saint's history, which is so doubtful as to give reason to believe that she never existed, attention was given to her representation in art, while the many superstitions practised on St. Agnes's Eve were discussed in detail.

Berlin Heraldic Exhibition.—We understand that the provisional committee for the English section of this proposed exhibition have dissolved.

THE ARTISTIC TREATMENT OF CONSTRUCTIONAL IRONWORK.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the sixth ordinary meeting of the present session, held on Monday evening last, Mr. Horace Jones, vice-president, in the chair, the drawings made by Mr. W. A. Lethaby, Pugin Student for 1881, were exhibited.

Mr. J. Macvicar Anderson, honorary secretary, called attention to a plaster bust of the late Mr. E. M. Barry, R.A., presented by Mr. Wolfe Barry, C.E., and being a reproduction of a bust by Mr. Woolner. He also called attention to some bequests to the Institute by the late Mr. Decimus Burton, including the models of the arch at the top of Constitution Hill and of the entrance to Hyde Park, opposite; two drawings; and a sum of 100*l*.

On the motion of Mr. Octavius Hansard, seconded by Mr. David Brandon, it was resolved to thank Mr. Wolfe Barry and the executors of Mr. Decimus Burton, and to ask Mr. Woolner to advise as to waxing the bust or of taking other means to preserve it in good condition.

Mr. Hugh Stannus, Associate, then read a paper on "The Artistic Treatment of Constructional Ironwork." He commenced by observing that ironwork had not been fairly treated either by its critics or by the great majority of its friends. Its critics refused to use it, except in a very limited manner, because, they said, it was an unarchitectural material, wanting in bulk and monumental effect, and was neither suited to any historic style nor had one of its own. By its friends, the material had been, so to speak, prematurely "drawn out" and exhibited, like a precocious child, dressed up in clothes not its own. The late Professor Barry, in one of his Academy lectures, said:—

"Iron is a great difficulty to the artist. The architect is glad to take advantage of its constructional assistance; but the application to it of artistic design, to make it a thing of beauty, is a problem, hard to solve. Our studies of art are based on examples of the pre-iron age, and it is not easy to take a new departure, and to treat what may almost be termed a new material in its bearing on architecture on new principles appropriate to its nature. This, however, must be done if iron is to enter effectively into architectural design; and we may be sure that as men have now discovered and appreciated the gain which iron has brought to them they will not easily surrender it. The world will not stand still for architects any more than for other men, and if we do not avail ourselves of the materials at hand, others will certainly do so, and the great works of the day will develop more and more of an exclusively engineering character."

Mr. George Aitchison, A.R.A., in a paper read before the Institute in 1864, observed that if any architect of that day had any new floor in hand which he desired to hand down to remote generations, he would not use iron in its construction; but to those whose works were not of such transcendent character he would recommend the use of iron in construction. The objection against iron on the score of its lack of bulk and monumental character had been stated very eloquently by Ruskin in his "Seven Lamps." Ruskin argued that "true architecture does not admit iron as a constructive material," and others had objected to its use "until we had become accustomed to it." Those who used this last objection might be compared to the Irishman who said he would not be able to get his boots on until he had worn them a fortnight. As to iron being wanting in bulk, so was the Parthenon as compared with the Pyramids, and Salisbury Cathedral was attenuated in its structural forms as compared with those of Norman work. The objection that constructive ironwork had no style of its own, that it did not spring, Athene-like, fully-equipped from the brains of its first user, was unfair, having regard to the newness of the material as largely applicable to constructive purposes. It should be remembered that the Greek Doric took a long time in attaining maturity. Although iron had to complain somewhat of the treatment it had received from its enemies and critics, it had more reason to complain of the way in which it had been served by foolish friends, who had tricked out this Cinderella in the finery of her elder sisters. These borrowed clothes iron would in time outgrow, and she would then, it was to be hoped, get clothes of her own. Her own garb, in the shape of a fairly characteristic treatment of iron, a material no longer to be ignored, and demanding artistic treatment, was what he (Mr. Stannus) pleaded for. Having avowed his aim

to be the addition to what was mere construction of those qualities which raise a design into the domain of architecture, the author said he proposed,—(1) To state the negative laws; (2) to realise the data of the problem; (3) to suggest the path along which its solution was most likely to be found. The broad negative laws prescribed that constructional ironwork should be so designed as not to imitate the characteristic forms of dissimilar materials, such as wood and stone. Forms produced by undercut carving, like the Corinthian and Early English capitals, should not be aped in iron, which could not rival their exquisite beauty. A second negative law was, not to carry on the mouldings and other forms of the wall against which iron may be placed. This was really but a special case coming under the first law. The practice alluded to was to be condemned as likely to lead to deception. The next negative law was, not to hide the joints and strengthening parts. The last negative law was, not to imitate natural forms. Thus in the selection of *motifs* cast-iron must not be ornamented with natural foliage. The prohibition was a case of the general law that in all mechanical repetitions the forms should be conventionalised. From a succession of the same flower or group of flowers repeated in cast iron, without either the infinite variety or the delightful crispness of nature, we turned away in disgust. Instances, with references to drawings, were given of breaches of these negative laws. The chief offender, it was pointed out, was cast iron, which was even made to ape the forms of wrought iron. As shaming such shams, the truthful, unaffected ironwork of the Crystal Palace was cited. Mr. Stannus hinted to those wishing to develop the proper treatment of ironwork that since they seemed to have somewhat lost the scent it would be better to hark back to this and other examples. Passing to the second division of his subject, the data of the problem, the author enumerated the advantages and difficulties of cast and wrought iron respectively as compared with stone or brick, and the resulting capabilities and necessities in construction, with a view to the development of the ornamentation from the construction, and to the architect's becoming possessed with the spirit of his material. This would enable him to accentuate its characteristic qualities. In favour of cast iron we had modelled surface, giving richness and hiding inequality; cheapness when there was a repetition of the same factors; largeness of pieces; easy renewal of parts; beauty of perforation when seen against the sky or light. Against it were rust and deterioration, whence the need of easy access to every part for frequent inspection and painting; the "strip" (incident on moulding in sand), preventing squareness; the difficulty of making the joints and bolts artistic. The advantages of wrought iron were: tensile value; lightness as compared with strength; largeness; easy renewal; beauty of perforation. Its disadvantages were rust, &c., as before; difficulty with joints, bolts, stiffness, &c., as before. To design ironwork, whether cast or wrought, so as to overcome these difficulties, and to produce works comparable with those in stone, with all the *prestige* of prescription on their side, was at present a hard task. But just as other difficulties in the world brought out man's nobler qualities, and just as it was not by shirking obstacles, but by surmounting them, that his pre-eminence was developed, so it was not by slurring over the special difficulties presented by ironwork, but by acknowledging and even emphasising them, and by developing the artistic treatment out of these very difficulties, that we should show the material by the character of the design. The curved form of the arch, and of that most perfect evolution from it,—rib-vaulting,—were both resultants from a disadvantage, namely, that the builders had only small stones and limited funds at their disposal, instead of those megalithic quarries and rich treasures which had rendered trabeate construction possible. So in iron architecture, if the forms were deduced logically from the difficulties of the material, there was a great future before it, and before any one who would take the trouble to master its capabilities. A great many suggestions were next given for designing in cast and wrought iron respectively. On the last head of his subject, Mr. Stannus pleaded for eclecticism as the most hopeful path of progress pending a gradual development in the right direction towards true independence. The Moresque style had been adopted for the details of the Paddington Railway Terminus, Brunel's architectural *collaborateur*, the late Sir Digby Wyatt, having turned to account the fact that the Moresque ornaments, being of plaster, were made in moulds, and were therefore adapted for reproduction in cast iron. Similar hints might be taken from the terra-cotta style which flourished in the valley of the Po during the fifteenth century. Some of the Indian buildings also, so finely illustrated by Mr. Fergusson, presented great wealth of suggestive detail for surface ornamentation. At the same time, the iron style of the future must be logically deduced, as well as eclectic. It should possess the purity of line and mathematical proportion of Greek architecture, the distributed surface decoration of the Mahommedan, the rich modelling of the Roman, the simplicity of the component parts of the Romanesque, and the economy of material, together with the constructive truth of the Gothic.

In the discussion which followed,

Mr. Joseph Jennings remarked that Mr. Stannus had said nothing on the question of the protection of ironwork from rust, excepting by means of paint. Now, if architects might expect, as he hoped they might, that the processes proposed for preventing the oxidation of iron would succeed and be applicable to ironwork on a large scale, they would be in a different position in the future with regard to the use of iron for construction. He agreed with a very great deal that Mr. Stannus had said, and especially so in thinking that the use of hollow cylindrical columns of iron was an unsound application of the material. In his opinion, the section of iron supports should always, in preference, be that of a solid cross, presenting no internal surface which could not be got at. With regard to ornamenting constructive ironwork by piercing the webs of girders, &c., a great deal of good effect was to be obtained, combined with lightness, by punching, and punching could now be done so as in no way to injure those parts of the ironwork which adjoined the perforations. With regard to the practical objection against inequality of bulk in castings, pointed out by Mr. Stannus, that could be obviated, if necessary, and where cost was no object, by cooling the castings gradually and in any one part at a time, just as glass was annealed. He begged to propose a vote of thanks to Mr. Stannus for his paper.

Mr. A. W. Blomfield said he was reminded by Mr. Stannus's *dictum* that we ought not to resort to stone forms of ornamentation for imitation in iron, of a most interesting paper, which was read by Mr. Skidmore before the Architectural Association a few years ago, in which the author attempted to show that all architectural forms were originally derived from metal-work. Although there was a great deal about it that was visionary, it certainly was a very ingenious paper. In it Mr. Skidmore sought to show that the Corinthian capital itself was derived from what had previously been done in metal work. Mr. Stannus had not said anything about hammered ironwork for foliage, but a very beautiful capital might be made of wrought iron in that way. He thought that Mr. Stannus's hints about new forms in iron columns or stanchions were very valuable to be borne in mind, as was also his remark about designing buildings downwards, the plan of a building being obviously in great measure, if not entirely, dependent on the method of roofing. Mr. Stannus had not said anything about the charming Spanish ornamental ironwork, which was almost a study in itself. Mr. Blomfield concluded by seconding the vote of thanks.

Mr. J. P. Seddon said he was afraid he could only speak as one of the critics of iron as a constructive material, although of course he was glad to welcome any attempt to improve its treatment. In his own practice he had never used iron if he could possibly help it, for he had never quite seen the possibility of treating it artistically for constructive purposes. He had always felt it to be an unmonumental material, and he had often contrived to do without it, even for flooring large spaces, and had succeeded, at any rate to his own satisfaction. However, in view of the great probability that iron was likely to be much more largely used in the future, Mr. Stannus had approached the consideration of the subject in the right direction. No doubt, the artistic treatment of the material when used constructively was capable of being greatly developed, even though it might never be developed into what could fairly be called a distinct style. The use of ironwork constructively had been left too much in the hands of the engineers. In this and in other respects it was an unfortunate thing that architects and engineers had come to be considered as two distinct bodies of men. There was no reason why this should be the case. Architects and engineers were equally constructors, and had to deal with precisely the same materials, the only difference being that the works of the engineer were generally on a larger scale than those of the architect. With regard to the suggestions for the treatment of constructive ironwork made by the late M. Viollet-le-Duc in his "Entretiens," they had always seemed to him (Mr. Seddon) the least satisfactory part of the work; some of them were even ludicrous, and were best left in the book, and not taken out for practical application. At the same time, if the design of constructive ironwork was more thoroughly studied in the spirit of Mr. Stannus's paper, he thought that great improvement would result, though he hoped that it would not fall to his (the speaker's) lot to have to make experiments in that direction.

Mr. Charles Fowler said that Mr. Stannus had read a very interesting paper, but the remark he made in it about concealing joints might be made to cut in the opposite direction to that intended. The beautifully carved bosses seen in Gothic vaulting at the points where the ribs intersected what were they but devices for concealing joints? Yet would any one desire to see those bosses removed? Even in the Crystal Palace, which, he agreed with Mr. Stannus, was an admirable example of the use of iron in construction, the joints were most scientifically concealed. He was not quite sure that he agreed with Mr. Stannus that in wrought-iron work the perforations themselves should always form the ornament, while in cast iron the substance of the metal itself should take the forms of the ornament. No doubt in the case of the web of a wrought-iron girder, or in any piece of iron bounded by rectilinear lines, ornament could well be formed by means of perforations, but he did not see that in a cast-iron girder the case was necessarily different. In the case of an ornamental cast-iron spandrel, too, he failed to see why the ornament should not be formed by perforations. Mr. Stannus had suggested that in any iron style of architecture that might be evolved, the abacus should, for consistency's sake, be made to follow the outline of whatever it had to carry, but in his (Mr. Fowler's) opinion that was not one of the necessary conditions of an iron style, for, as he need hardly say, square, octagonal, and circular abaci were used by the Gothic architects without any reference whatever to the contour of the superincumbent mass. He quite concurred with Mr. Stannus as to the necessity of designing a building downwards, and he believed that the roof of the Crystal Palace was the first part of the building designed. As to the concealment of iron construction, there was at least one instance in which he thought such concealment legitimate, viz., its application to the strengthening of concrete constructions, as used by the late Mr. Matthew Allen, who very fairly compared the combination of iron and concrete in that way to the bones and flesh of the human body. The use of such a combination of the two materials was likely, he thought, to be much extended, and with proper regard to the strength of varying forms was likely to be very useful.

Mr. George Elkington, jun., thought that Mr. Stannus had laid down some capital rules for the guidance of architects who might have to design buildings that were chiefly iron, but the great difficulty experienced by architects in the use of iron was how to properly use it in buildings where it only formed a part of the construction. To suppose a common case, that of a shop or warehouse where a wide and uninterrupted window-space was required on the ground-floor. In such a case, as everybody knew, resort was had to the use of an iron girder to carry the upper part of the façade, and it was a very common thing to conceal such a girder. Was it right to do so? If not, how would Mr. Stannus treat it? Again, would it be a legitimate use of iron in construction to make a façade of a kind of framework of iron, filled in with panels or slabs of terra cotta or other material similar in *motif*,—say, to the marble slabs inserted in the façade of the Certosa at Pavia?

Professor Kerr said that he had long regarded the subject under discussion as one of the most difficult questions in modern architectural philosophy. It should be fully borne in mind that Mr. Stannus's paper was about the ironwork of architectural construction as distinguished from

the ironwork of ornamental art. The latter subject, he ventured to think, was very well understood, and had been well exemplified in many charming modern works. The ironwork of constructional architecture had been very largely illustrated, frequently by engineers and occasionally by architects, without any success to speak of. The question whether iron was to be a building material of the future was not easily answered in the affirmative, but, nevertheless, taking it to be so to some extent, no matter what, how ought it to be treated, with a reasonable amount of articulation, so as to be on a par with stone, timber, terra-cotta, and some other materials? That was a very large question, a question of strict logic,—and it should be remembered that artistic instinct was artistic logic, or nothing. Whether the problem was to be worked out or not, it was desirable that the profession should understand it, and it occurred to him, now that the Institute was becoming a wealthy body, some of its members, with ingenious proclivities and powerful minds, might direct their energies to the solution of the question if properly encouraged by the offer of rewards. The question was in what direction ought thought to be directed in the attempt at a solution? Now as to whether iron was likely to be a material much used for architectural construction in the future, his own opinion was that it was not, for it did not promise anything permanent or anything satisfactory in the way of that long permanence the idea of which was inseparably associated with architecture of the highest class. There was the fatal objection of the oxide, especially in a climate like ours, and the oxide formed so rapidly, and was removed so very readily, that it was a serious objection to the use of iron in construction. The use of paint was a most unsatisfactory way of meeting the difficulty, for there was no paint yet invented which approached perfection in arresting the oxidation of iron. The preservative process to which Mr. Jennings had referred had certainly been advertised a little, but he (the Professor) had not seen any exhibition of articles treated by it which gave promise of the process being generally used for the treatment of constructive ironwork. If, therefore, iron were used, it must be painted, and painted continually, and that was a continual element of expense. Even when painted externally, much of it could not be painted internally, and the action of the atmosphere on the internal portions of iron columns and girders was likely to be very serious in the space of fifty years. The treatment of iron as a mere matter of ornamental art, as used both in Mediæval and Renaissance times for gates, railings, and so on, was not, as he had said, now in question. A great deal of good work had been done in that direction, but Mr. Stannus's paper dealt with the much more serious matter of constructive ironwork. Now, with regard to that matter, the real question was, how were architects to construct a great railway station (say), on the lines on which an engineer would build such a structure, and yet make it architectural in character? Engineers, as a rule, and to their credit, did not pretend to treat ironwork in any other way than structurally. The materials available for iron construction were, shortly, two,—cast iron and rolled iron,—for malleable iron in construction might be regarded as rolled iron, and as being available only in a very limited range of forms. Then the designer of iron constructions had to bear in mind, as a most striking distinction between cast and rolled iron, that whereas cast iron as regarded resistances to tension and compression, stood as 1 to 6 respectively, rolled iron, as regarded the same resistances, stood practically as 1 to 1. That distinction pointed to two essentially different modes of designing in iron, if, as on true architectural principles should be the case, ironwork was to be designed on the basis of its own conditions; and if it were not articulated precisely on the basis of its own conditions, it was not architecturally treated, but was a mere sham, as all architects' ironwork always was. Engineers' ironwork, on the other hand, was not a sham, because there was no attempt at making it beautiful. Cast iron, as everybody knew, was a very treacherous material to use in construction, and it was, happily, going out of use more and more. The range of forms possible in rolled iron was very limited: whence, then, was to come material for an iron style, while, as Mr. Stannus had hinted, architects considered themselves tied by traditional architectural forms,—forms which were tied to other materials, and which it was impossible to dismiss from the mind all at once? All art, it should be remembered, was extremely slow in its development, and it might, he thought, be safely concluded that if ironwork continued to be as largely used as it was now for constructive purposes (as to which he was doubtful), something in the way of its architectural treatment would be the outcome. We of the present generation were not, he thought, to repine because we did not seem to be likely to accomplish it. It might require a century for its development. But, at any rate, there was plenty of room for attempts in the way of an improved treatment of constructive ironwork. As to sham architecture in ironwork, the extent to which it had been carried in America was something astounding. For instance, the whole of the dome of the Capitol at Washington, and of the two peristyles which surmount it, were of cast iron, no doubt very carefully designed and calculated, but such was an utterly wrong application of ironwork to the purposes of architectural construction.

Mr. C. F. Hayward said that constructional ironwork applied to architecture was carried out a good many years ago with a great deal of *éclat* at the Oxford Museum, to a great extent, he believed, with the help of Mr. Ruskin. That work was done by Mr. Skidmore. As regarded colour, how was ironwork to be treated in colour, associated as it sometimes was with red brick, sometimes with stones of different colours, and sometimes with white marble?

The Chairman, in closing the discussion, while thanking Professor Kerr for his remarks, said he must differ from the view expressed by him against the beauty of suspension-bridges. He (the Chairman) thought that one of the most pleasing modes of employing iron in its tensile use was in suspension-bridges, and such structures, he thought, were often very charming elements in a landscape. With regard to the paper, he had always thought, and he still thought, that iron should be treated as a distinct material, and as having a distinct use as compared with other materials. In regard to the desire manifested for improvement in iron construction, which was a very laudable one, it was not, he thought, a hopeless one. The art of architecture was accumulative and progressive, and much was to be hoped for in the future. The first use of wrought-iron girders in buildings was quite within the memory of most gentlemen present. He thought that one of the first instances of their use was in a floor constructed from his plans some thirty-five years ago, the girders being made by Messrs. Finch, who built the Chepstow Bridge. Since that date there had been a vast improvement in the manufacture of girders, both in respect of strength and economy of material. In conclusion, the Chairman put the vote of thanks, which was carried unanimously.

Mr. Stannus, in the course of a few observations in reply, said that in his paper, as written, he had treated somewhat in detail the subject of the painting of ironwork, but in order to save time in reading he had cut out that part of his paper, which could however, if desired, be printed with the rest of it in the Institute "Transactions." Mr. Blomfield had alluded to the possibility of making the foliage of a Corinthian capital in wrought iron. That he did not deny; indeed, Huntington Shaw's gates, formerly in the grounds of Hampton Court, but now in the South Kensington Museum, were good illustrations of the possibilities of foliage in beaten ironwork. He quite appreciated the beauty of the Spanish ironwork mentioned by Mr. Blomfield, but he did not think that it came quite within the scope of his paper. He did not think that the use of carved bosses at the intersection of ribs in stone vaulting, cited by Mr. Fowler, was quite apposite as an argument for the concealment of joints in structural ironwork. He agreed with Professor Kerr (whose remarks would form a valuable appendix to his paper) that cast iron was a treacherous material, but he chiefly advocated its employment in situations where it need not be depended upon for strength. In conclusion, Mr. Stannus expressed his fear that the discussion of the subject was perhaps more incomplete than he had hoped it would have been. When he received an invitation to read a paper on the subject, he had looked forward to hearing the mature views of their late President, whose great and rare ability would have justly entitled his opinions to great weight.

The meeting then terminated.

BUILDERS, SPARE OUR TREES!

We have never ceased to fight against the thoughtless destruction of greenery which, in most instances the growth of many generations, it would be impossible to replace. There is more than one side to the question; there is something more than the sentimental view to be taken of the steady advance of our metropolis on the green fields that within the memory of even youngsters have been covered with long streets, with acres of crescents, of squares, and of gardens,—gardens in which, let it be noted, sickly shrubs are replanted where, perhaps, grew before stately trees; in which imported sods are made to replace the meadow grass that preceded the work of the builder. Londoners of the West End have cause to be grateful to the careful regard with which in and about the neighbourhood of the Redcliffe and "Boltons" estates the noble old trees have, in so many cases, been preserved, and we have only to contrast this portion of the suburbs with those in the north-east of the metropolis, where such terrible devastation has been committed, to recognise the enormous advantage obtained by so worthy and proper a regard for nature.

There is, we repeat, another than the sentimental view to be taken of this thoughtless plan of destroying the old trees on an estate "to be laid out for building purposes." Is it not the very love of greenery, of the open air, of plants, that tempts yearly thousands of inhabitants from the crowded city to reside in the suburbs, even at inconvenience to themselves? To how many of these thousands is not his garden the chief pride, to which he hurries home at night, for which he buys his seeds, his rose-bushes, from which he brings to town his flowers, in which he gathers his hardly-grown strawberries, and those red currants and raspberries which in the Sunday tart taste as no other currants and raspberries in the world? A love of greenery is deeply implanted in the bosom of undefiled human nature. If it be true, as some of our scientists have asserted, that the origins of our species are clearly indicated in the love which all children show for grubbing in the earth, it is equally noteworthy that this love does not fade with growing years; and yet with the acknowledged fact we see tree after tree vanish round the metropolis before the steady advance of bricks and mortar.

There are, in addition to the sentimental regrets for the disappearance of our old trees, other reasons why such unthinking action should be prevented where possible. The hygienic value of trees has long been explained: their power to absorb the vitiated air, and apparently to breathe out a healthy atmosphere,—a property possessed by many trees, but as far as we know most strongly developed in all the *Eucalypti*. But there is another argument in favour of the trees being spared in those neighbourhoods which are now so rapidly being swallowed up by the necessities for housing our increasing population. Did but the builders and landowners fully understand that many a hesitating tenant might be secured by the presence of an old tree before his door or in his garden, or even for the matter of that in his neighbour's garden, we should, we suspect, hear less of the destruction of the trees which are still scattered round the capital. More than one of our readers would, doubtless, be able to mention instances of a similar nature to those which we might bring forward, to show the existence on the part of tenants of very decided views regarding the trees on their property. We remember the case of an expiring lease, the renewal of which was a matter of debate, decided by the thoughtless destruction by the landlord of a lovely tree; though it may be urged that this was the sentimental expression of a tenant who could afford to pay for his sentiment, such feelings actuate none the less the occupants of those acres of bricks and mortar with which our industrious builders are belting our metropolis and cutting us off more and more from the green country outside, which but a few years ago stretched into our very midst.

Why is it that at this moment the proposed park at Paddington is receiving such attention? It is because it is feared that a large tract of greenery may disappear, and its value to the people is greater than money they would obtain from the capitalists. To what purpose is it that we expend enormous sums on the purchase of breathing-spaces in our cities? To what purpose is it that heavy rates are levied for the beautifying of our public gardens, that trees are

planted,—where unthinking opposition is not opposed to their beneficial presence,—while we are allowing the free gifts of nature, gifts which have taken centuries to mature, to be destroyed about us?

LIVERPOOL ENGINEERING SOCIETY.

THE first meeting of the eighth session of this Society was held on the 18th inst., at the Royal Institution, Colquitt-street, the President (Mr. F. Salmon) in the chair.

After the usual business, Mr. H. F. Bellamy read a paper on "The Plymouth Corporation Waterworks." He showed that prior to A.D. 1590, the chief source of supply was from wells in the town, and that the Corporation, finding this supply inadequate, obtained an Act of Parliament,—a brief extract of which was given, and which continues to the present day,—to introduce a supply from the river Meavy, by means of an open channel or "leat." With reference to proposed improvements, he stated that the supply still being inadequate, a storage reservoir of about 350 million gallons capacity is to be constructed within the water-shed of the river Meavy, above the Head Weir. The resources of this water-shed he showed to be very great. The pipe line is to be extended about five miles to Roborough Down, and a series of settling tanks and an intake reservoir constructed there.

SMOKE ABATEMENT IN THE FOURTEENTH CENTURY.

WE have recently noticed and quoted in these pages the warm and well-worded complaint of a writer of the seventeenth century against the smoke nuisance that then troubled the metropolis, and from which we are still suffering, in spite of the loud outcry that has once more been raised. For 600 years, however, it would appear that Londoners have been uttering the same complaint, as any one may see who will open that sturdy archæologist old Stow's "Survey of London," almost on the very first page of which will be found detailed the grievances brought against the use of sea-coal as early as the reign of Edward I. The king, evidently memorialised on the subject, as we should now say, issued a proclamation prohibiting the use of sea-coal, and punishing with penalties which one would almost wish to see revived, those owners of furnaces or chimneys which, after due notice, continued to be-foul the air with ill-consumed smoke. The measures adopted were rather of the preventive than the curative order, but the effect produced seems temporarily at least to have attained the object desired.

It was formerly thought,—remarks Strype in his continuation of Stow's Survey (London, 1754),—to contribute much to the preservation of the good air of the City that nothing was burned here but wood or charcoal, and that even in trades where much fire was used. But when workmen living in the outskirts of London began to bring in the burning of sea-coal, which was about the reign of Edward I., it was much complained of as tending greatly to the making of the place unhealthful. About the latter end of that king's reign it was that brewers, dyers, and other artificers using great fires began to use sea-coal instead of wood and charcoal, in or near the City, which occasioned the prelates, nobles, commons, and other people of the realm resorting thither to Parliament, and upon other occasions, with the inhabitants of the City and the villages of Southwark, Walbrook, and East Smithfield, to complain thereof thrice, one time after another, to the king, as a public nuisance corrupting the air with its stink and smoke, to the great prejudice and detriment of their health. The king, therefore, first prohibited the burning of seal-coal by his proclamation, which, disobeyed by many for their private lucre, upon a second complaint he issued a commission to inquire of all such who burned sea-coal against his proclamation within the said city or parts adjoining, and to punish them for the first offence with great fines, and upon the second offence to demolish their furnaces, kilns, &c., wherein they burned sea-coals, to see the proclamation strictly observed for time to come, as a record, 35 Ed. I. (1307), informeth.

That custom is second nature is proverbial, and such, it appears, is the case in regard to the use of "sea-coal," for though we find Evelyn complaining of its abuse,—Evelyn, it must be remembered, had lived a long time in the clear atmosphere of foreign wood and charcoal burning cities,—Londoners at all times have accustomed themselves to the thick atmosphere of their capital. It is an old story that the City clerk, once allowed a holiday after many years' stay in town, found the air at Hampstead "rather thin"; and so it is, we suppose, that we find Strype, writing almost a century after Evelyn, remarking that the use of coal as fuel "is no where in these days reported a public nuisance." Such, however, is not our opinion a hundred and fifty years again after Strype. We have borne the evil now 600 years; that, we think, even for Englishmen, is long enough. At long intervals we have exercised the thoroughly English privilege of grumbling; it is surely time now to act.

SUGGESTIONS FOR THE CONDUCT OF ARCHITECTURAL COMPETITIONS.

IN October last, the Council of the Royal Institute of British Architects ordered a digest to be prepared on the basis of the suggestions sent to the Lord Provost of Glasgow by them in reply to an application for assistance by the municipal authorities of that city in framing the conditions of the competition for their proposed new municipal buildings,—the said digest to ultimately take the place of the Institute Official Paper on Competitions. On the 30th of December approval was formally given by the Council to the following amended paper:—

1. The promoters of an intended competition should, as their first step, appoint one or more professional assessors, architects of established reputation, whose names should be published in the original advertisements and instructions, and whose decision should govern the selection of the designs in all stages of the competition.
2. The duty of these assessors should be,—
   - *a* To draw up the particulars and conditions, or to advise upon and supplement them if already drawn up.
   - *b* To determine which of the designs conform to those instructions.
   - *c* To exclude all others; and
   - *d* To advise the promoters on the relative merits of the designs admitted to competition.
3. Every member of the body promoting the competition, and every assessor engaged upon it, should abstain absolutely from taking part in the said competition, or from acting as architect in the execution of the proposed work.
4. The number and scale of the required drawings should be distinctly stated, and they should not be more in number or to a larger scale than necessary to clearly explain the design. If perspective views be required, they should be uniform in size, number, mode of colouring, &c.
5. Competitions should be initiated either by inviting preliminary sketches, preparatory to a final competition, or by personal invitation. The promoters, with the advice of the professional assessor or assessors, should select from such sketch designs not less than —— (here specify the number), the authors of which should be invited to join in a final competition, in which it is desirable that each should be paid for the preparation of his design a sum to be fixed by the promoters, with the advice of the assessor or assessors. The author of the design selected from among these should be employed to carry out the work, and the other designs returned to their authors.
6. Each design should be distinguished only by a motto or device, and any attempt to influence the decision of the promoters, or of the assessor or assessors, should disqualify a competitor.
7. A design ought to be excluded from a competition:—
   - *a* if sent in after the period named (accidents in transit excepted);
   - *b* if in violation of the instructions;
   - *c* if it do not substantially give the accommodation asked for;
   - *d* if it exceed the limits of site; and
   - *e* if the Assessor or Assessors (with or without the assistance of a surveyor) should determine that its probable cost will exceed by 10 per cent. the intended outlay or the estimate of the competitor.
8. All the submitted designs, except any excluded under clause 7, should be publicly exhibited after the final award. The report of the assessor or assessors, and the decision of the promoters, should be published at the time of exhibition.

These suggestions have not yet been adopted by the general body of members of the Institute, but will come up for consideration at the meeting to be held on Monday, the 20th of March.

THE ST. PAUL'S INSTITUTE AND LIBERAL CLUB, BURTON-ON-TRENT.

THE extensive block of buildings which has been erected near St. Paul's Church, by the munificence of Mr. M. T. Bass, M.P., who has borne the whole of the cost, was opened on Saturday last. The buildings are Gothic in style, and have been erected from the designs and under the superintendence of Mr. Reginald Churchill, architect. The main entrance is from Rangemore-street, under a portico with five arches, supported on columns of red Mansfield stone and Hopton Wood stone, with polished grey granite bases, and foliated caps and cornice. On either side of the inner porch are rooms which serve the double purpose of class-rooms for the Sunday-school and of cloak and reception rooms when used in connexion with the large hall. The latter, which is 100 ft. in length to the back of the organ-chamber by 40 ft. wide, is faced internally with red and white bricks in patterns, with a dado of red glazed tiles. The side walls are divided by stone piers into eight bays, and the roof principals spring from the caps of these piers. The roof is open to the hall, and ceiled in pitch pine. The most prominent external feature is the clock-tower at the south-east angle of the buildings. This is 86 ft. in height, and the porch beneath it forms the entrance to the Liberal Club. The furniture of the club is of oak throughout. The general contract has been carried out by Messrs. Lowe & Sons, assisted by Mr. De Ville as joiner, and by Messrs. Pickering Bros. as plumbers. Mr. F. Stevenson, of Wednesbury, has carried out the whole of the decorations. These are well spoken of, Lincrusta-Walton being, we note, largely used therein. The clock in the tower strikes Cambridge chimes upon four bells, and these and the hour-bell,—weighing 19 cwt.,—have been supplied by Messrs. Taylor & Son, of Loughborough. The whole of the tiles on the floors and walls have been supplied and fixed by Messrs. Minton, Hollins, & Co., of Stoke-upon-Trent. The carving throughout the building has been executed by Mr. S. Tinkler, of Derby. Mr. E. H. Cogswell acted as clerk of the works during a portion of the progress of the work.

A House in Dorchester. — A handsome mansion is now in course of erection, in the higher part of High West-street, for the Hon. Mrs. Asnley. The architects are Messrs. Crickmay & Sons, of Weymouth, and the style of architecture is of a Classic character. The principal part of the building faces and runs flush with Dorchester's picturesque main thoroughfare. It adjoins the Shirehall. The materials used in the construction are light bricks for some of the walling, and the rest, and all the dressings, are of Bath stone. The roof-line is broken by two pediments, and by an open stone balustraded cornice running between and at either end. The pediments, of course, cut into, and rise considerably above, the cornice. The pediments are carved, and so are all the capitals which surmount the various pilasters. The whole of the carved work is being carried out by Mr. Harry Hems. The servants' apartments and offices occur in two wings, annexed to and running out at right angles from each end of the building. These are connected below ground by a subway. The contractor is Mr. George J. G. Gregory, a builder of high standing in Dorchester.

Proposed Academy of Art in Wales.—The *Rhyl Journal* says that a movement is on foot among the artists resident in Wales to establish a Welsh Society of Arts. Though a Royal Academy has existed in England for more than a century, and the Scottish and Hibernian Academies are old institutions in Scotland and Ireland respectively, yet Wales has no kindred society. The majority of the artists resident in Wales, and those connected with the Principality, have, it is stated, agreed to form themselves into a society, with the objects of holding annual summer exhibitions at Llandudno.

THE INTERNATIONAL ELECTRICAL EXHIBITION.

MUCH important and costly work has been done and much activity is being exercised, in preparing for this, that will prove probably the most attractive certainly, and literally the most brilliant show that has ever been made at the Crystal Palace. A visit this week will have made it apparent that much remains to be done before the preparations and arrangements can be pronounced complete. The fixing of the date for the presentation by the Lord Mayor of the prizes awarded at the recent wool and woolmanufacturing exhibition, will, it is expected, so stimulate exhibitors as to secure completion of their work on or before the date referred to,—January 31st. Exhibitors and their representatives, who took part in the Paris Electrical Exhibition, and others, express freely the opinion that this will be incontestably the most comprehensive and imposing display of electrical appliances that has ever been made in either the Old or the New World. This may be inferred from the fact that there will be upwards of 250 exhibitors, and an aggregate number of exhibits too large to admit of even an approximate estimate being given without great expenditure of time. A notable and novel feature in this exhibition, and one that will give public satisfaction, it may be supposed, is that it has the endorsement and direct encouragement of Her Majesty's Government. The provisional catalogue has in the fore-front fifty-six entries relating to exhibits from the Government Postal Telegraph department. Many of these entries relate to groups, not to single objects; as, for instance, there are four sets of testing-apparatus, eleven items of apparatus connected with pneumatic tubes, six relating to historical telegraphic apparatus, three to the first laid cables, four to coils and needles, six to "keys," eight to "relays," three to iron line wire joints, three to railway signalling instruments, seventeen to lightning protectors, thirty-two to insulators, a collection of ten batteries, and specimens of twenty-one submarine cables in use now by the Post-office Telegraph department. The exhibits from the War Office department had not arrived when the provisional catalogue was printed. They are now, however, delivered, and are numerous, important, and highly interesting; they are being arranged and looked after by a detachment of Royal Engineers.

The main body of the exhibits is grouped in fourteen classes, that include static electricity, batteries and allied apparatus, magneto-electric and dynamo-electric machines; cables, wires, conductors, and allied apparatus; apparatus for measuring electricity; telegraph signals and allied apparatus; telephones, microphones, and photophones, including, among many wonders inconceivable a little while ago, "telephone signal apparatus for submarine intercommunication between several persons at one time." The provisional catalogue needs correction in some places; as, for instance, under "Class VIII., Electric Lighting," it is stated that "the Crystal Palace Station of the London, Brighton, and South Coast Railway is entirely lighted by Jablochkoff," whereas that station is usually not lighted at all, more than by a few feeble jets of bad gas, that only serve to make "darkness visible." Portable electric lamps are shown in this class. Other classes are electric motors and transmission of energy; electro-medical apparatus; electro-chemistry; magnets, compasses, horology, instruments of precision, &c. The miscellanea, indispensable in many attempts at classification, includes,—electrical automatic tell-tale tills; tell-tale clock for watchmen; a rotating table, sewing-machine, improved cement, non-magnetisable watches, electric camera, advertising and electric signs, asbestos articles, and electric toys. The last group in the arrangement is of generators, steam, gas, and hydraulic engines, &c., applicable to electric industries. Foreign exhibitors, of whom there are about ninety, have their exhibits grouped in the same thirteen classes as the English exhibitors. The foreign miscellanea embraces various motors for toys; an automatic silk-reeling machine; automatic analyser of fire-damp; egg-hatching machines and artificial mothers; artificial feeders, and electric testers for eggs.

Among the Post-office exhibits are a model of a cable-ship, a diagram showing the remarkable growth in the number of Post-office telegraphs from the date of the transfer of the telegraphs to the State up to the present date, and an illustration of Norwegian woodpeckers piercing telegraph-poles in search of insects, that the birds possibly imagine to be in the wood from the humming sound produced by the wires. From Mr. C. Nielson, Chief Director of the Norwegian Telegraphs, a very interesting chapter is quoted in the official catalogue on the impression produced on birds, bears, and wolves by the humming sound of the telegraph wires. A few of the exhibitors have shown their lights partially, but none of them perhaps so fully as Mr. T. A. Edison. He lights up the concert-room with chandeliers, with festoons over the front of the gallery, and pendants with four lights under the gallery.

THE GERMAN GOVERNMENT AND ARCHITECTURE.

A REMARKABLE step has been decided upon by the German Government in connexion with the subject of architecture. In order that the building, architectural, and engineering professions in Germany, whose members are to a large extent Government officials, may obtain early and complete intelligence as to what is being done abroad in the way of architecture, it has been determined to appoint an architect as an *attaché* to each of the principal German embassies in foreign capitals. It is announced that the first appointments will be made to the embassies in Paris and Washington. It will be the duty of these architectural *attachés* to make regular and complete reports of all the new inventions of importance in connexion with architecture and engineering in the respective countries in which they are appointed. They will likewise have to report upon the principal new edifices of importance in course of erection, and to give an account of all features of novelty and value in such buildings.* In this connexion it may be added that the German Government has also appointed an architect, as a permanent official, in connexion with the German Archæological Institute at Athens. The gentleman appointed is Herr W. Dörpfeld, who distinguished himself as the technical chief throughout the excavations at Olympia, where he was engaged for four years. He enjoys the favour both of the Hellenic Government and of Dr. Schliemann, for both of whom Herr Dörpfeld is expected to be employed to conduct important researches.

THE GERMAN PARLIAMENT HOUSE.

AT length, after ten years of irresolution and debate, the German Parliament has adopted a resolution in accordance with which immediate steps will be taken to carry out the project of erecting a permanent and worthy Imperial Parliament House. For years there has been a sum of nearly a million and a half sterling lying ready for this purpose, but the conflict of opinion as to the proper site has hitherto prevented anything being done. It has now been decided that the site shall be on the Königs Platz, Berlin. This place lies a little to the north of the Brandenburg Gate, outside the old city boundary, and not far from the end of the fine avenue, Unter den Linden. It is in the centre of the Königs Platz that that singular monument, the Column of Victory, is placed, which commemorates the triumph of the German arms in 1870 and 1871. The only spots available for the new House are two in number. One is occupied by Kroll's Theatre, the other by several buildings belonging, some to Count Raczynski, and other private owners, and others to the State and Municipal authorities. The Kroll Theatre site has been declined, and the latter chosen. It is rather smaller than the site contemplated at the time of the International competition for designs for the new House. Instead of being 150 mètres long by 115 mètres wide, the dimensions required have been reduced to 136 mètres by 95. The reduction in the area has, of course, caused a modification in the original designs, and it is probable that the residences originally intended for the President or Speaker, and some other officials, will either be omitted or much curtailed.

As regards the cost of the entire scheme, the site will altogether cost 8,135,000 marks, or 406,750*l.* sterling. The private property which will have to be bought will cost 6,700,000 marks. The Prussian Treasury owns another portion of the site, which it will present gratis to the German Parliament, only requiring to be indemnified to the extent of 1,435,000 marks for the buildings, which it owns there, and which will have to be replaced by new edifices elsewhere. Finally, the Berlin Municipality grants gratis another portion of the required site, which is now occupied by part of a street.

With regard to the cost of the building, the Government estimate places it at 14,400,000 marks, or 720,000*l.* sterling. Adding to this the cost of the site, 406,750*l.*, the total cost will amount to 1,126,750*l.* sterling. The funds already at the disposal of the Parliament for the purpose of erecting the new palace are 29,593,573 marks, or 1,479,678*l.*, so that unless other changes are made, and if the architects keep within the estimate, there will be a surplus of 352,928*l.* It is, however, by no means certain that some more or less extensive modifications will not be made in the designs which would necessitate a larger expenditure than that here mentioned. So far as the site is concerned, the Imperial Parliament have already made the necessary grant for the purchase.

The next step will be a re-examination of the plans which were successful at the competition ten years ago. There appears no chance of the late Sir Gilbert Scott's Gothic design being realised, although it was one of the four that obtained prizes and was much admired. The first prize was won by Professor Bohnstedt, of Gotha, and, although there are many leading architects who urge that it would be better to institute another competition, it seems likely that Professor Bohnstedt's design will be adopted in its main outlines, with, of course, the necessary modifications required by the smaller site and some other considerations. In order to carry out the scheme a committee has been resolved upon, to consist partly of members of the Federal council and partly of members of the Reichstag, under the presidency of the Chancellor.

* The German Government propose, in fact, to endeavour to effect at once throughout Europe what an individual in England thought it desirable to attempt, by the establishment of a modest Bursary, to obtain gradually for the advantage of architecture and the public in England.

SHEFFIELD SCHOOL BOARD COMPETITION.

AT the last monthly meeting of the Sheffield School Board, the following report, in respect to the school proposed to be built at the Huntsman's Gardens, Attercliffe, at a cost of 12,000*l.*, including furnishing, architect's, and other professional charges, was submitted:—

The Buildings Committee have carefully considered the fifty plans sent in for competition. At the outset a day was given to a general consideration of the whole, and fifteen were set aside as more nearly complying with the instructions to architects than the rest. At a subsequent meeting the number of selected plans was reduced to five, and these have since been very carefully re-examined. On closely comparing these with the instructions, the committee came to the conclusion that the plans marked "Dux" (in A B C), plan A, for the Mixed School, and that marked "Dux" (in A B C), plan B, for the Infants' School, with some slight modifications, be recommended to the Board for acceptance, subject to the conditions set forth in the instructions of the Board, and provided that a contract be obtained for carrying out the works for the specified amount. The committee further consider that on the whole the plans submitted under the motto "Quo je surmonte," come next in merit, and they therefore recommend that the premium of 25*l.* be awarded to the author of that design.

The other plans on the list for the final selection were marked respectively, "Great Faith," "S.S.B.", and "Truth."

The Chairman, after the plan was chosen, announced that it was discovered to be that of Mr. C. J. Innocent, architect, of George-street, Sheffield, and the other in order was the production of Mr. J. B. Mitchell-Withers, architect, Surrey-street, Sheffield. It was also stated that "Great Faith" was sent in by Messrs. Bellamy & Hardy, of Lincoln; "S.S.B.", by Mr. F. W. Roper, of London; and "Truth," by Mr. John Sidebottom, of Preston.

We shall illustrate Mr. Innocent's plans.

Hexham Surveyorship.—At a meeting of the Hexham Local Board, held on the 16th inst., Mr. Robert Grieves, Assistant Borough Surveyor of South Shields, was unanimously elected Surveyor to that Authority. There were sixty applicants for the appointment.

PRINCIPAL FAÇADE OF THE PALACE OF KING DON PEDRO, SEVILLE.

FEW monuments of Spain have been more incorrectly spoken of than has the famous palace, the principal façade of which we illustrate in our present number. It has been generally believed that this building was erected by Abdul Aziz, and restored by Don Pedro, without taking into account the fact that the building bears on its façade the evidence of its origin, which points to the conclusion that it was Don Pedro who ordered its erection. At the completion of the work, to which the monarch had devoted himself from the year 1353, Don Pedro ordered a broad fillet to be inserted in the upper part of the façade, on which was carved the following Arabic inscription in Cufic characters, repeated and arranged in such a way as to read, "There is no other conqueror than God." Its border has another inscription, in thick monastic characters, which runs, "The most high and most noble and most powerful and most victorious Don Pedro, by the grace of God, King of Castille and of Leon, ordered this palace and its portals to be erected, which were completed in the year one thousand four hundred and twelve." This palace has been regarded as one of the most important monuments of the style of architecture then prevailing on the banks of the Tagus, whence are said to have come the artisans who, with the aid of the architects and builders of Seville, succeeded in carrying out the fantastic ideas of the king of Castille. Raised as the edifice was a little later than the Alhambra at Granada, it may be considered to represent a transition from the Granada style, the palace there bearing a close resemblance, especially as regards ornamentation, to the Seville edifice of Don Pedro.

NEW SCHOOL FOR THE REV. JAS. REPWORTH, YORK.

THE building will hold eighty boys and eighty girls, and will be built of stock bricks, with terra-cotta and stone dressings. Mr. Repworth bears the entire cost, which will be about 1,200*l*. Two class-rooms are provided, and small playground at the back. The architect is Mr. Henry Nathan Smith, of Cheetham, Manchester.

RAISED FLOCK PAPERS.

THE design shown is intended for a raised flock, and, if based upon any style at all, is in that of the Greek method of brush-work, which, as will be seen, lends itself readily to the material selected. The repeat is 21 in. by 17 in., that is, two across, but it could be reduced to three across, if desired, and used either as a dado or filling, while the cost would be very little more than that of a fairly good ordinary paper, and it would last for a great many years.

The chief objection urged against the use of raised flock papers has been that they hold dust. While not prepared to deny this, the amount of dust so held is small and might be removed by a periodical brushing without in the least injuring the pattern, and even washed and scrubbed if previously flatted, while there is still left this advantage, that the flock could be hung in its natural colour; when dirty, coloured, and then from time to time washed, as suggested. In paperhangings it has often been contended that the unavoidable flatness of colour and want of relief were antagonistic to the artistic qualities they might otherwise possess, and that for the want of this relief it was impossible to get broken colour, or a completely satisfactory decorative result. To meet this difficulty various efforts have been made from time to time with more or less success, but of all the mechanical inventions, be they expensive or cheap, nothing has been done which has been so successful as the invention of raised flocks.

Although flock papers are by no means a modern or (that misused word) æsthetic invention, seeing that they were printed in England as early as the sixteenth century (indeed, examples may still be seen, in beautiful preservation upon the walls of Hampton Court Palace), yet the raised flock papers now so universally used were first printed by one of our best and oldest houses of paper-stainers about 1853, and taken up a few years after as a speciality by a leading London firm.

Since that time such has been the demand for them that there is hardly a house of any importance that does not manufacture raised flock paper, and that, too, in great quantities, the success depending mainly on the pattern.

As to this point, it is by no means an easy matter to design a pattern to meet all the requirements of the material and manufacturing process. No foreshortening is permissible. Neither is it possible to use delicate detail, or support badly-formed lines by shading degrees of depth, while naturalesque treatment of any subject is opposed to the nature of the material. Designs for raised flock should be carried out in a more or less conventional treatment, the shade being broken up into equal proportions of work and ground. The advantage, where there is a doubt, should be on the side of the ground, which should always make the outline which divides the various parts of the pattern.

The use of raised flocks has been the means towards advancing the true principles of decorative design, especially those applied to flat mechanical decoration. Insomuch as those true principles include the proportionate distribution of form; the single-colour completement; the avoidance of foreshortening, or purely naturalesque copyism; the use and inclination towards proper constructional lines, and careful rejection of all unnecessary detail; it has followed that as the material and manner of manufacture so imperatively demanded their observance, the artists and designers have been compelled to give more thought and attention to these principles, as well as obedience to the necessity of applying them. And the claim raised flock has to its position as a legitimate decorative material can be based upon no surer foundation than that the very material compels an observance of these invariably accepted laws.

Rooms hung entirely with raised flocks may be made to have artistic and complete effect, even when left in their original state. If a richer colour effect is desired, they can be flatted, and a still richer result gained by simply rolling the parts in relief. As a rule, four printings are sufficient to give the required relief, which is just deep enough to throw a shadow that does not cover up the ground, and give the effect of pierced work. It can, however, be printed in much higher relief when required, as it sometimes might be for large ceilings, friezes, &c. As to its durability, there are numerous examples to be seen on the walls of the Houses of Parliament and other public buildings, which have been up for more than a quarter of a century, their original colours still in good condition. G. C. H.

THE CENTRAL STATION OF THE VIENNA CIRCULAR ELEVATED RAILWAY.

WE publish this week an illustration of the proposed Central Station on the Franz Josefs Quai, near the Bourse, and on the banks of the Donau Canal, intended as the chief station of the Elevated Circular Railway, the project for which is now before the Municipal Corporation of Vienna, and has already received the warm approval of the Austrian Government and the railway authorities.

The terminal stations of the seven principal lines of railways approaching Vienna are all situate outside the second circle of ancient ramparts, and consequently at considerable distances from the thickly-inhabited parts of the city, which lie principally within the old lines of fortification. These lines also form the limits of the *octroi*, and consequently there is an additional tax, in addition to an extra cab fare, imposed on all vehicles and passengers entering the city.

One of the principal objects of the intended "Ringbahn," or Circular Railway, designed by Mr. Joseph Fogerty, M. Inst. C.E. and F.R.I.B.A. of Westminster, being the connexion of all the existing railways, and the transmission of traffic to and from the heart of the city to all parts of the Austrian Empire, the construction of a large central station became a vital necessity in the scheme; but to find a site for such an extensive building in the proper quarter was a task surrounded with difficulties. After much consideration, the solution of the problem was discovered in the idea of erecting a building in such form that only a small portion of the space on the ground-floor level would be required for the purpose of the railway traffic: that is, for booking-offices, customs and police bureaux, and for the reception and transmission of passengers and their luggage. These are concentrated in a central block, about 70 mètres square, containing a central hall, 44 mètres by 33 mètres, from which the platforms overhead are reached by lateral staircases, external access to the principal approaches being provided at both sides.

The station proper, which is to be about 250 mètres long by 56 mètres in width, under cover, is therefore altogether on the upper floor, and contains ample provision at the sides for the offices of the officials, refreshment and waiting rooms, telegraphs and porters, &c., with special apartments, as usual in Austria, for the Imperial family and the guests of royalty.

Carriages and luggage are to be raised to the level of the platforms from the street level by numerous hydraulic lifts.

The remaining covered areas of the ground-floor, forming very extensive blocks, are to be surrendered to the municipality for public purposes, such as a fruit and flower market on the left, and a kinder-garten, or children's playground, on the right. There is also a space reserved for a fish-market, for the Danube Sauvetage Association's warehouses, and other useful municipal institutions, hitherto occupying ground on the bank of the Donau Canal, which is in reality a branch of the Danube flowing through Vienna.

The new quay to be formed in front of the station, on this canal, will enable ready interchange of traffic to be made with the steam navigation on the river, which is very great during the summer months.

The total length of the elevated station from the points where the sidings commence to leave the normal iron viaduct, is about 2,000 ft., and of this a middle length of about 1,000 ft. will be occupied by platforms, thus forming a double-ended station from which the longest trains made up in Austria can be despatched in opposite directions, the limitation in width necessitated by the site being thus overcome by the fact that the Central Station is situated on a circle. Hydraulic traversers will be fixed at each end of the station for the interchange of carriages from one line of rails to another.

Three double lines of rail and a single central "relief-line" are proposed, giving a total length of about 6,000 ft. of available platform, which is greater than that of any of our metropolitan stations.

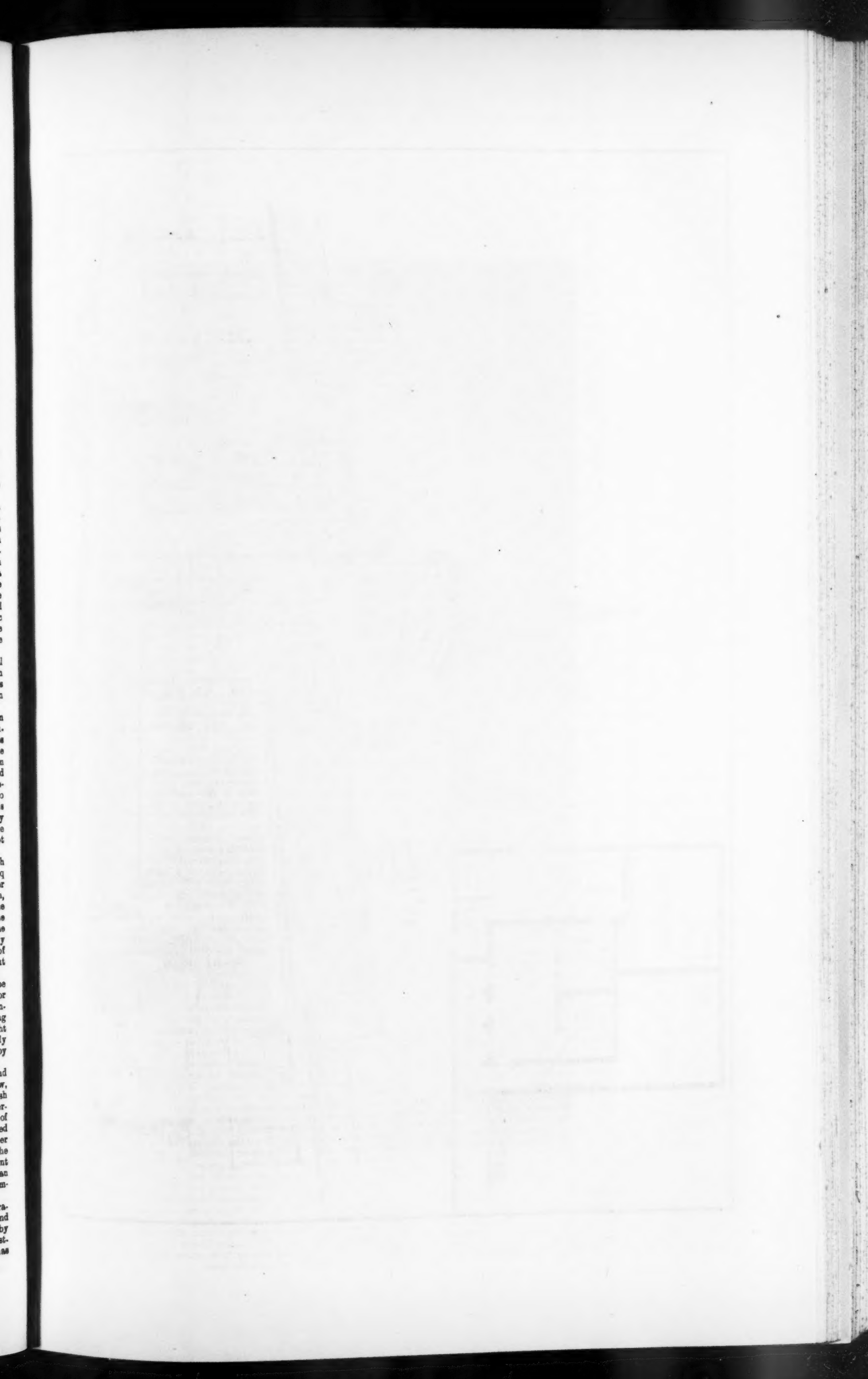
The sides of the platforms will be formed in panels containing reflecting-lens lights to illuminate the covered areas and the booking-offices beneath, and the spaces between the sleepers in the fan-shaped approaches at the ends of the station are to be in general left open to allow light and air to be transmitted to the ornamental shrubberies of the public gardens beneath so as to deprive the city of as little as possible of its highly valued recreation-grounds. In this way the objections to the occupation of part of the Central Park will be greatly mitigated, if not altogether removed.

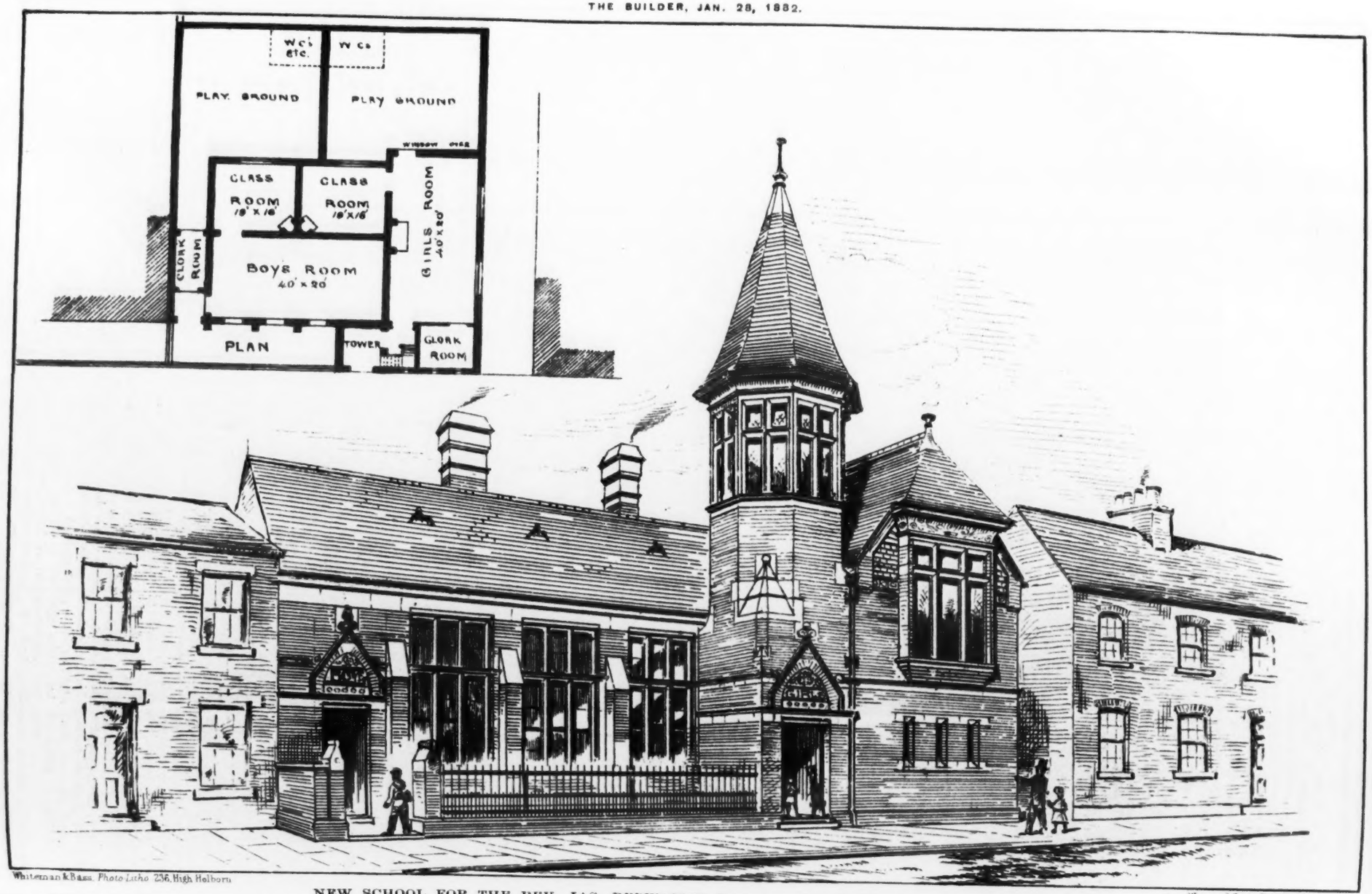
As it is proposed to work the railway with fireless locomotives, on the Lamme and Francq system in use at Lille and near Paris, no danger from ashes will arise in this form of construction, which it is intended to adopt largely in the general structure of the elevated viaducts of the Circular Railway and branches. At the same time, it is believed that electricity will ultimately become the chief motor in this novel system of city railways, the total length of which is about eighteen miles.

The building of the Central Station will be chiefly constructed of iron, the contract for which must be let, under the terms of the concession, to an Austrian firm. That for the Ring Railway itself, involving 70,000 tons of wrought and cast iron, has already been let provisionally to the Witkowitz Iron Company, owned by Messrs. Rothschild & Guttmann, of Vienna.

Messrs. Ransomes & Rapier, of Ipswich, and the Anderton Foundry Company, of Glasgow, are the general contractors to the English syndicate who have initiated this great undertaking, which involves a total expenditure of about 4,000,000*l*., yet, nevertheless, it is believed it will be executed at less than half the cost per mile of the London Metropolitan Railway, the overhead system of construction, at the present low price of iron, being not only cheaper than brick tunnel, but the saving in land and compensation is very great.

Mr. Fogerty has been assisted in the preparation of the designs for the Central Station and other important structures of this railway by Mr. Charles Henry Driver, F.R.I.B.A., of Westminster, from whose drawing our illustration has been produced.





Whiteman & Bass, *Photo Litho* 236, High Holborn.

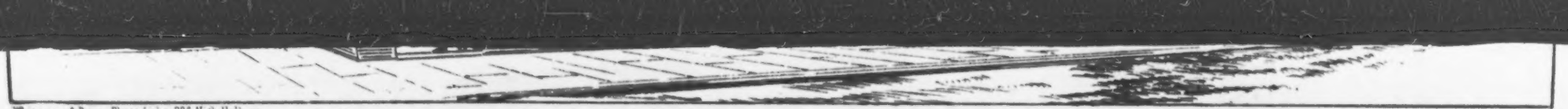
NEW SCHOOL FOR THE REV. JAS. REPWORTH, YORK.—Mr. H. Nathan Smith, Architect.

Wyman & Sons, Printers, Fetter Lane.

NEW SCHOOL FOR THE REV. JAS. REPWORTH, YORK.—MR. H. NATHAN SMITH, ARCHITECT.

THE PALACE OF THE KING DON PEDRO, AT SEVILLE: PRINCIPAL FAÇADE.

A.D. 1412.



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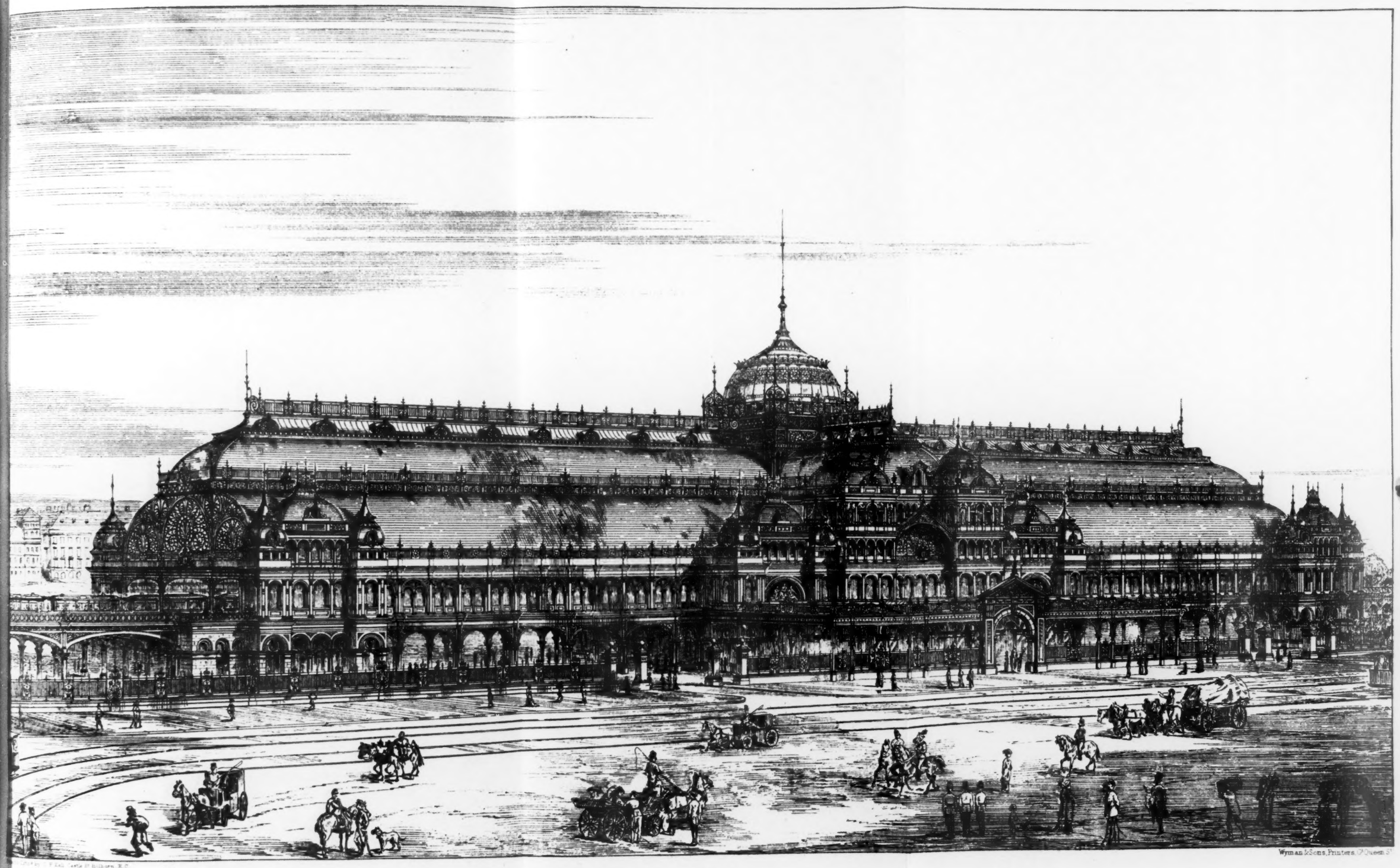

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VIENNA CITY RAILWAYS: DESIGN FOR CENTRAL STATION.—Mr. Joseph Fogerty, C.E., Architect.

Whiteman & Bass, Photo-Litho. Wyman & Sons, Printers.

RAISED FLOCK PAPER.——Designed by Mr. G. C. Haite.

ARCHITECTURAL INCONSISTENCIES.

THIS was the title of a paper read before the Architectural Association on the 20th inst. by Mr. Philip E. Masey. After a few words of commendation for the useful work done by the Association, the author proceeded to strongly condemn the practice of architects taking premiums for imparting the art and mystery of their profession, and neglecting to do so. Such were, he said, morally guilty of obtaining money by false pretences. In the course of his remarks on this subject he suggested that on the occasion of the examinations and awards of medals at the Association and at the Institute, it should be stated to whom the successful students had been articled. He then proceeded:—Masters in this way may get to take an interest in the advancement and successes of their pupils, and so endeavour to push them on as reflecting honour on themselves; and certainly those who do this are fairly entitled to the credit of it. And if architects did thus their duty, the benefits of this Association, having attained such a high position of usefulness, would not be lessened, but increased, having so much the better material to deal with. I hope for and expect a grand career for the Association. I should expect in time it will be affiliated to the Institute, the members having access to the lectures and library thereby, and that also they will be free to the libraries and have sketching privileges at the South Kensington and British Museums, and have free admission to all the art exhibitions of the metropolis. What I have said so far is really only a preliminary to my subject, though I think the evil pointed out may be truly considered as one of inconsistency, and a very serious one too.

The architects of old were unquestionably practical men, consequently their work for the most part is equally distinguished for taste and judgment, beauty and constructive consistency; and were it possible now for the architectural student to take a turn of work in the joiner's shop, in the mason's yard, and at the forge of the smith, he would, I think, make a better architect. Certainly, the more the pupil sees of these trades the less likely will he be to commit practical inconsistencies. As it is, such abound. I have often been struck with the inconsistent use, in modern work, of barge-boards. In old time, you know, they were used to stop the horizontal timbers of the roof. It was an ornamental way of dealing with the outside rafter. But these boards were only used to wooden buildings, and thereto because the purlins, plates, &c., required a good bearing to sail over the external framing, and doubtless, too, it was seen that a good projection of roof would assist to make the house, whose walls were comparatively thin, dry and comfortable. The necessity did not occur in brick or stone construction, the usual thickness of wall there giving good bearing and defence: consequently the Mediæval builders never put barge-boards to such buildings. Now, however, I see them without any propriety of distinction, and the old idea is so far lost sight of that probably the board, instead of stopping the actual roof timbers, has special supports for it! Indeed, the old intention has been so far lost sight of that I have seen an imitation barge-board on the face of a building carved in stone, and in another case the boards placed on top of the slates! The hip-knob, too, which requires to be but little longer than is sufficient to receive the end of the board, and which rarely in old work rises above the roof, is now ridiculously elongated to perhaps 10 ft. or 15 ft.,—exaggerated for vulgar show.

Wooden-framed houses are now in fashion. To be consistent with old examples and real requirements, they should be of solid and substantial construction. But in what a flimsy makeshift way the modern work is done! Halved uprights; angles in two pieces; thin joists (which have to be cased for appearance sake when they come into view); sham blocks inserted to look like beams; no substantial tie, but the sides held together by straps and coach-screws! I pity those who live in such houses. Draughty and leaky they must be, and colds, rheumatism, and, it may be, consumption, are a heavy price to pay for this made-up picturesqueness. This construction is often resorted to for the sake of cheapness, but if properly solid, it would be as expensive as brick or stone.

I know but of one modern addition to the ornamental (if it be such) resources of the carpenters' art, and a miserable thing, in my opinion, it is. I refer to V-jointing; I protest against it. The reason assigned in excuse for this vulgarity, that it hides shrinkage, is insufficient. It does not do so, but makes it really more manifest, and besides, there ought not to be shrinkage. To so make a defect in order to hide a defect is about as reasonable as a man with a new coat thinking that as in time it would get threadbare and rent, he had therefore better at once make false rents and put on threadbare patches so that the real deterioration from time to time might not be seen! In modern Classical buildings panelling boards fit without gaping, why not in Gothic? The carpenter, of course, approves of the thing, because it extenuates the use of unseasoned material. The small architect, too, likes it (especially the chapel architect), because it makes a show of design without cost. The inconsistency of the thing is shown in that although oak is the most difficult wood to obtain seasoned and unshrinking, yet the practice is to except this wood from the spoiling chamfer, and to leave the joint square.

In wooden roofs of Gothic churches there is often perpetrated the glaring inconsistency of putting a Perpendicular hammer-beam roof on a building designed in an earlier style. The Irvingite church in Gordon-square is an example of this perverse, unreasonable treatment, and there are many others. Whatever style is chosen, it should be carried through. To the eye of taste such incongruous anachronisms are most offensive. Some would-be superior men, too, will make the chancel of a new church of a different date to the nave, or, beginning at the west end, will gradually work down to a later period, increasing in ornament to the east. These are utter frivolities. Also, if a wooden roof is used, it should be constructed of wood entirely. It can be done, and common sense and consistency require it. It is, however, a common practice to use, for the purpose of tying the roof together, wrought-iron rods, with a miserable attempt at disguise as if part of the gaswork. If walls be substantially thick a foot-tie to the principals is not needed. If the walls are slim and weak (too generally the case) there is no reason why the tie should not be of wood. The ancients were not ashamed of a foot-tie showing for what it really was. Why should we be? The fear in this respect is as absurd as the horror I remember there used to be in the Classical time lest a chimney should show on the roof. Old French examples can well be followed as precedents for foot-ties.

In the re-introduction of Gothic for domestic purposes, one of the greatest difficulties has been in the windows, to adapt the mullioned window to modern needs. Instead of meeting the difficulty boldly with fitting and appropriate treatment, architects generally have attempted a compromise, and, as in such inconsistent attempts generally, have failed. As the little lattice of olden time did not meet modern requirements, a bungling conjunction of sliding sashes behind stone mullions and transoms has been the usual thing done, and it is as bad as bad can be. In expensive buildings, hinged gun-metal casements and gun-metal rising sashes with springs, have in some cases been adopted, but these are very expensive, and do not give much air, though neat. Such devices are not for common use. For our eccentric climate, with its preponderance of wet, and subject to such rapid changes, I hold that there is nothing comparable in comfort and convenience to the common lifting-sash. For more equable climates, no doubt, the French casement is as good or better. Now, I would warn the young architect not to go over the ground on which so many have stumbled, but to admit the necessity of the sash, with its bothering boxings, and to design the stonework accordingly. As a general rule, the more stable materials should over-rule that which is less so, but this is an exception. But what becomes of the mullions and transoms? say you. Well, you must do without them. Instead of a broad mullion-divided window, put two or three moderately wide but independent window-openings side by side, and though the light apertures be square or only slightly arcuated, yet, following French and German examples, arch-heads can be put over. This is done by some, and the sooner that the clumsy practice first in vogue is given up the better. The Mediæval architecture of this country has many and special beauties of its own, but in one or two particulars foreign work has peculiarities which may well be engrafted on our own style; and with respect to windows, I recommend the projecting sill with a drip under splay. It is very unsightly, in towns especially, to see the dirt-stains down the wall,—washings from the window-sills. I have seen an example of projecting sill done by the elder Pugin, and wonder it has not become general. The projecting balcony, never seen in our old work, though common abroad, is also worth importing.

The present craze for subdividing the window sash into small squares with thick bars is inconsistency with a vengeance. The purpose of a window is to give light inwards and view outwards, and the more perfectly a window does this the better; and in effecting this double purpose we have in the present day the great advantage of glass in large sheets, than which nothing is more handsome or more perfect. Yet, for the sake of novelty and restless love of change, people go back to the imperfections of old date. To be consistent they should also take to tallow candles and rush-lights, eat off pewter, use steel forks, &c. It is a less objectionable fashion, whilst having large-sized glass panes below, to have the upper parts of Gothic windows glazed ornamentally with leaded lights. I see not why the ornamental pierced leadwork which was at one time used should not be re-introduced.

A peculiarity of old stonework, almost without exception, is the circumstance of having a joint through the apex of the arch. This should be your practice, as it saves labour and facilitates setting. Yet I often see in modern work this wholesome rule disregarded, from ignorance, I suppose. In the so-called "restoration" of the crypt of St. Stephen's Chapel, Westminster, is an example of this mistake; and another bad departure from the old rule I saw there, the label being worked on the arch-stones of the window-heads, which the old masons never did, it being wasteful of time and material. A great beauty in old work is its unostentatiousness, the absence of all personal vanity in its designers, and it is the predominating evidence of vanity and love of vulgar display which makes much modern work perfectly nauseous. This sin is most besetting in those who design Nonconformist chapels, in which the effort is constantly visible of attempting to make a show and grand display, the means being miserably insufficient. Why cannot a chapel consistently be a chapel instead of shamming to be a church? If a one-span roof is a positive requirement, the building should honestly show outside that this is the case, and not be notched-back on its apron-faced show-front to mimic a nave and aisles. This is rank burlesque in architecture, yet it is constantly being done. The towers and spires of these chapel architects are grossly inconsistent when one notices how slight are the walls, and how thin and mean-looking the woodwork always is. Scottish church architecture, by the way, is very similar to this. The only good Nonconformist chapel I have ever seen (and that because it is at variance with chapel notions of architecture) is one by no less a person than Mr. Butterfield, at Bristol. It has real nave and aisles, and, you may be sure, with good stone piers and arcade, instead of chapel-like cast-iron pipes. This building is quiet and respectable-looking. I think it may be worth mentioning, in respect of this example, an oversight in the omission of a damp-proof course. This has been since added by a patient local builder, who cut out at ground level a hole through the wall (rubble stone), a yard at a time, and so inserted round the building the needed adjunct, and this without any injury to the superstructure. A chapel architect who shall be content with consistent simplicity of design, preferring sound construction to weak display; designing according to requirements, and not attempting to pass it for something else, is a man much wanted, and who has yet to appear. The one-side show-front is a bad chapel characteristic, with its over-traceried windows, its over-blown cabbage carving, its niches and notches, chamfers and splays, bristling with points and angles, and with flanks, it may be, and coarse brickwork. At one time this sort of thing was done by church architects, as at Camberwell and Hanwell by the late Sir Gilbert Scott, but better taste and judgment now ordinarily rule. The stern realities of Butterfield and Brooks are a gratifying exposition of true principles, which Nonconformists should study and imitate.

Over-big capitals with ponderous carving are a very general fault with second-rate architects, and with the capital copied from one church and the arch from another their arcades are

often inconsistent. The square abacus of Early French, now much affected, is absurd if used with splayed arch. I see this done, however.

Architects very inconsistently copy the arrangement of old churches, though at variance with convenience and propriety, in the matter of chancel aisles. These, in old work, were mortuary chapels, fitted for service, with altar, &c., but are now imitated for organ-chamber and vestry purposes, for which they are unadapted. Of late, in closer imitation of the Roman Catholic Lady Chapel, a so-called "morning chapel" is formed, but it is unneeded. This reminds one of the old lady who had a large hole cut in the bottom of her yard-door for the big dog to enter, and a small hole for the little dog. An organ-chamber should be an organ-chamber, and a vestry a vestry. The first will require greater height than the aisle usually affords, and the vestry, instead of open arches, should have closed sides. The merely screened-in vestry, though it satisfies architectural vanity, is an inconsistency and an abomination, from its lack of privacy. You probably know the story of the country parson, accustomed to stone walls, going to preach in a strange church, and thoughtlessly, when robing, asking the clerk aloud, in common phraseology, for a useful but vulgar article. Can you imagine his horror when the clerk, by a sign, makes him cognisant of the dreadful fact that only a curtain separates him from the waiting congregation? Such accidents,—and something of the kind, no doubt, has happened,—ought not to be possible.

Two important additions, of great beauty and importance, were made to the stock features of Classical architecture by the Renaissance architects, viz., the rustication of angles, and new forms of rustication, and the balustrade. Rustication expresses massive solidity and strength, and therefore should be used in the lower part of a building; yet, with utter inconsistency, in the Art Union offices in the Strand you will see that the first-floor story is rusticated and the ground-floor not. It gives one the idea of the floors having been transposed. If it was a strong point with the designer to have his first-floor so, he should certainly have made the lower one also of a vermiculated or bossed type, so as to appear the stronger of the two. In the Grand Hotel, Charing-cross, you may see inconsistency in the rustication at angles. To be appropriate it should start from the ground, but there, on the ground-floor, are polished granite pilasters, on several stories above is a rusticated quoin, then a panelled pilaster, then rustication again. The rustication should have gone all the way through from the bottom, though it might vary in character. The design of this building generally is much open to criticism. Variety is a good thing, but when, as here, you get too much, the result is wild disorder. Of the balustrade, its common use to windows, to fill up under the sill in place of a panel, is an inconsistency best avoided.

Sacred writers compare men to sheep, and with great propriety. The sheep is the most stupid of all animals, and more particularly in its propensity for senseless imitation; and in this respect men are particularly like sheep, and especially so are architects. As an illustration of what sheep are, I remember a case in the North a few winters ago, when a leading sheep fell into a deep trench, and could not get out. The rest of the flock followed suit, jumping in one on top of another, and were all smothered. So, if a leading architect takes an eccentric "header" into a "Queen Anne" or some other pestiferous pitfall, he is immediately followed by a host of imitators, and there, architecturally, they perish miserably.

Brick is a humble, honest, and trustworthy friend, and, though not lovely in appearance, is a good material for the atmosphere of London. Its use for churches here is, therefore, consistent; but what is to me vexatious is to see the mania of imitation tempting architects to build in brick in country places where stone is available. And so with tiles, &c. In the south-eastern counties in olden time they, having no choice, were obliged to use them, and after a few centuries the colour becomes agreeable; but they get used now, though no necessity exists, and though the material is in every respect inferior to slate, because some one architect sets the example, and the ugly things are even imported into slate districts.

In the matter of church doors I beg to give a coup'le of hints which may be useful. The one is to mind not to forget to see that the book-stones are let into the jambs as the work proceeds. These are sometimes forgotten, and the blunder is not to be remedied. The books, if merely fixed by the shanks being driven into the joints of stonework, soon loosen, and are an unmitigated nuisance. The other is to mind that the inside arch of the doorway is sufficiently high to allow the door to open. The arch is ruled by thickness of wall. It will not do to judge by look. You must first find the position of the door when open, on the section, in order to get the springing-line. This is a pitfall for many a young architect. If you use strap hinges, see that they are of wrought-iron, and form part of the hanging arrangement. In the use of cast-iron sham hinges the chapel architects are great sinners; and so, even, are some church architects. It is a wonder to me to see these abominations in the illustrated catalogues of good firms. It shows, I fear, that there must be a considerable demand for them.

Stanchion bars to windows are needed as a protection against thieves as well as for support to the glazing. (By-the-bye, you seldom see them in chapels.) Be sure you put them on the outside of the windows. I have seen them set inside, and, in consequence, where the hopper casement came a piece of the bar was cut off and attached to the glazing. It looked all right when the casement was closed, but when open, the piece of bar flapped with it. This was a sort of consistent inconsistency.

I see errors committed, as it seems to me, by determining on a thing from its front look only. For instance, in a church I know, the unpractised designer has put detached columns, with corbelled caps and bases, to carry window-labels. In front (though the idea is absurd) the faultiness is not seen; sideways, the projection of the cap is seen to be in absurd excess of the requirements. The bulk of anything carried on capitals should fully occupy the area, standing well over. Similarly, at Holloway's shop in Oxford-street,—a thing of very bastard Gothic,—the heavy window-columns support a hollow; and in the refreshment-room at the Brighton Aquarium there are columns, semi-Classical, supporting nothing (by the way, how is it that, as in this Aquarium, and in the shop before mentioned, and in the Langham Hotel, the architects have mixed styles?). The most notable case of this inconsistency between the carrier and the load which I have seen of late is in the Hall at the Natural History Museum. The side-piers have shafts, as for vaulting purposes, running up from the floor, of massive Romanesque character. As the eye ascends to the roof, instead of finding a covering in character, a roof of extreme lightness is seen, the principals being of wrought iron, with pierced ornament. In elevation on drawing the inconsistency would not be obvious, but in execution it strikes one at once. It was a pity, it seems to me, that a terra-cotta arch was not thrown across as a principal at each pier, by which means consistency would have been preserved and a novel and striking effect produced. But if this device was deemed too daring, or iron preferred, the principals had better have been of cast iron, with moulded instead of pierced ribs, and made solid enough to carry out the character of the piers.

In connexion with iron engineering work, this rule requires to be borne in mind: that whereas the engineer designs with a minimum of material, not caring for appearance, architecture of monumental character always requires a surplus of material. There is an adjoining roof to the one I have alluded to in which the relative conditions are much happier.

I spoke of the architectural pupil being taught landscape-drawing, the which, to some, may appear unnecessary. I think it quite needed, as every one should be able to make his own perspective drawing, and without a knowledge of the accessories to make a picture the thing is but half done. Now that reproduction by printing is so easy, perspective drawing is coming much into vogue, but though many are able to draw the building well, there is usually a total failure as regards sky, foliage, and figures,—and, unhappily, the tyro seems to delight in these things in proportion to his inability to depict them properly, and so his drawing is spoiled. Where such positive inability exists, it would be far better to show no sky or trees, or only just a line or two to express cumulus or cirrus, the foliage being merely in outline, and no figures. In order that the pupil may attain something like consistency in his perspective drawing, I will give some general rules he should be careful to observe. Be mindful that the forms of your clouds, trees, or mountains forming your background do not shape themselves round the features of your building,—a very common defect. Such forms should be as diverse as possible to the architectural lines. Sky or other background should be very delicately done. One sometimes sees a sky so coarsely rendered as to itself become the main object, at the expense of all else. Unless in the case of a cottage or very small structure, trees should never show from behind over the roofs, or the building will be fatally dwarfed. If you want your building to look large, have as little margin for landscape as possible, and no big trees or other large objects in the foreground. A hash is usually made with figures. The artistic rule is to put the figures in the least interesting part of the picture,—a rule which the young architect usually runs counter to. Do not put figures in door-jambs, where they are confused with the columns, or under any strong perpendicular line, which they will seem to carry; and the less perpendicular the figures are the better. No exact rule can be given for arranging these details, as every subject will require its own treatment. It is always necessary, in the general effect, that there should be a balance of parts. The student should practise sketching figures, as, besides the need in respect of perspective, there is great advantage in being able to draw statuary in and about buildings. The generality of architectural drawings are sadly deficient in this particular, and buildings are often totally spoiled by the clumsy carving depicted. There are two theories and methods as regards linear drawing,—the old-fashioned fine line and the modern coarse line styles. The old style, common in my young days, required the line used to be of the finest, and then, on completion, the drawing was "washed" to make the line still finer. This was the extreme in one direction, and the evil of this fine line was that it almost defied tracing. The modern thick line, applauded by the late Mr. Burges, errs in the opposite extreme, as the delineation of minute detail is impossible with it. A great objection to the new style, I consider, is the prominence given to the jointing. The truth is that consistency requires the line to be fine or thick according to the size and nature of the drawing. Any fixed rule is bad; it is a matter of circumstances. The great mischief of the coarse line is that it excuses carelessness and ignorance: details which ought to be clearly shown are slurred over. London drawing is, as a rule, I consider, inferior to that done in country offices (I speak of London-bred pupils), and English drawing is inferior to French or German. Good drawing is a matter of great importance, as it is pretty certain that a good draughtsman will make a good architect, for the greater facility he has in expressing his ideas, the more active a man is likely to be in exercising his mind. Certain it is that he who is at the head of the profession at the present time, the most successful architect of the day (Mr. Waterhouse), is also the most accomplished artist. But, though draughtsmanship goes far to make an architect, yet to be a successful architect good business qualities are required as well.

In bringing these cursory remarks to a close, I desire you to remember that I address only the younger members. I do not affect to have made any new discovery either in construction or design. I simply wish to inculcate *thoroughness*, and the need, in general design, of studiously avoiding anything for which a common-sense reason cannot be given, and, in regard to details, to habitually "look round" them, so to speak. Whether working in the Classical, Gothic, or Renaissance styles, the pupil should go to old work as his only consistent guide, and so, in the words of our great poet,—

> "Instructed by the antiquary times
> He must, he is, he cannot but be wise."

[We defer our report of the discussion that ensued.]

Shrewsbury School of Art.—On Saturday, the 21st of January, Sir Baldwyn Leighton, bart., M.P., distributed the prizes to the successful students, and gave a short address. The prizes, numbering about twenty, included a National Bronze Medal (awarded to Miss Edgell for a design for a mirror frame), and four third-grade prizes. The school is said to be in a sound financial position, though it does not meet with much support outside.

SUPERVISION OF PUBLIC BUILDINGS ABROAD.

AT Munich the authorities have issued a regulation requiring that in future the plans of every proposed new building, designed to accommodate large numbers of people together in one apartment, shall be submitted to the Municipal Authorities and to the President of Police before permission is granted for the erection of the structure. The object is that the two authorities above mentioned may satisfy themselves as to the adequacy of the arrangements of every new hall, theatre, &c., to avoid danger from fire, and secure the safety of the audience against peril from fire and panic.

OBITUARY.

Mr. Allan M'Call, Architect.—On the 18th, in presence of the Mayor and a large number of spectators, the mortal remains of Mr. Adam M'Call, the leader of the Livingstone Mission on the River Congo, were consigned to the grave in Leicester Cemetery. The son of Dumfries parents, an architect and surveyor by profession, he had during the seven years from 1872 to 1878, inclusive, according to the *Telegraph*, travelled between 15,000 and 20,000 miles in South and South Central Africa. He visited Cape Colony, the Orange Free State, Griqualand West, Natal, the Transvaal, Bechuana Land, the Matabele Country, the Zambesi Valley, the celebrated Victoria Falls, and the Upper Waters of the Zambesi, some 2,000 miles inland from Cape Town. During the last two years of his life there he traversed regions almost untrodden by white men, and for twelve months did not even receive a letter. Two years ago he left England for the purpose of leading an expedition up to Stanley Pool, on the Upper Congo, accompanied by four young men, all thoroughly fitted for pioneer work. Six missionaries had preceded them. It was when almost within view of the realisation of his desires that Mr. M'Call was stricken down by illness. He left for England, and died when he reached Madeira.

Mr. John Linnell, the painter, died on the 20th inst. at his residence at Redhill, Surrey. Notwithstanding his advanced age, and the fact that he would not suffer himself to be elected a member of the Royal Academy, his pictures were to be seen on the walls at Burlington House down to the most recent exhibitions. In last year's exhibition there he had one picture, the "Woodcutter," No. 177 in the catalogue. Mr. Linnell, who was born in London in June, 1792, painted in oil as early as 1804, and was, about 1805, a pupil of John Varley, the father of the existing school of water-colour painting. He first exhibited at the Academy in 1807, "Fishermen, a Scene from Nature." He obtained a medal at the Royal Academy in that year for a drawing from the life, and another in 1810 for the best model from the life, and the prize of fifty guineas at the British Institution for the best landscape in 1809. He exhibited at the Academy again in 1821, landscape and portraits.

Mr. Wm. Miller, the well-known line engraver, who for more than half a century was employed, with great success, in translating into black and white many of the designs of our greater English painters, and especially of Turner, died on the 20th inst., while on a visit to Sheffield. He was in his eighty-sixth year. A little of his work was done before the year 1830, for the "Southern Coast" of Turner; and shortly afterwards, Turner highly appreciating his labours, Miller was engaged upon the illustrations to the "Prose Works of Sir Walter Scott," and in 1834 upon that edition of "Rogers's Poems" which the collector seeks for by reason of the Turner designs.

The Newton Abbot School of Science and Art.—The new session is being opened with some vigour. The committee desire to encourage and develop, as opportunity and occasion admit, the decoration of pottery, for which the neighbourhood offers special facilities, in the hope that this may become the speciality of the Newton Abbot School of Art. During the last session day classes were held twice weekly under Mr. A. Fisher, of Torquay, with an attendance of twenty students, who worked in both under-glaze and over-glaze colours on pottery, and many of the works produced won medals of merit and prizes in numerous exhibitions during the past summer, in both London and the provinces.

THE CHAMBERS AND OFFICES COMPANY.

WE are a slow people to adopt changes, more especially in our social habits. Gradually, handsome blocks of buildings have been erected in the metropolis which contain within themselves many separate dwellings, familiarly known as flats. They have the advantages of private houses, are more economic by reason of their compactness, and are far less costly to keep up. The contingent expenses attendant upon the occupancy of a separate dwelling-house, such as the periodical renovation of the outside, the drains, lighting, warming, water services, insurance, and so forth, are considerable; whereas, when these charges are divisible, as in the case of joint occupation of the same building, they are then comparatively unimportant. With all this, the public have been somewhat tardy to profit by living in flats. It may have been they hesitated to make a change from the established rule of dwelling in separate houses, or were apprehensive of inconveniences. Notwithstanding, the time has now come when, to a considerable extent, it is the custom to live in flats, as in Paris and other Continental cities. Difficulties have hitherto been found in disposing of them separately, if occupied as private dwellings or as offices, from the fact that, previously to special legislation, a freehold interest in separate chambers and offices might have been created, but it was found impracticable to deal with such an interest, for the want of some convenient organisation by which the rights common to occupiers could be managed, and the cost of rebuilding in case of fire might be recovered. This is now provided for by a private Act of Parliament passed last session incorporating the Chambers and Offices Company. This Act facilitates the management of blocks of buildings and the disposal of each separate tenement, and gives power to the company, as a single controlling authority over buildings constructed for occupation as separate tenements, to levy contributions, defray general expenses, and for the management of all parts of a building common to all tenements, thus securing to purchasers their individual rights. The advantages to be derived from this Act will also apply to industrial dwellings, and it is desirable that artisans and others should avail themselves of its benefits to secure long leasehold or freehold homes of their own. The Chambers and Offices Company have an influential Board of directors; their offices are at 21, Cannon-street, City.

MILFORD DOCKS RAILWAY AND PIER.

ATTENTION has been directed within the last few days to the progress of the important works at Milford Haven, the effect of the completion of which on our maritime trade it is not easy to anticipate. There is not, however, very much to add to the recent notice of the new docks which has appeared in our columns. The wet dock covers 40 acres, and the graving-dock is the largest in the United Kingdom, being 815 ft. long, 96 ft. wide, and with a sill 36 ft. below the high-water level of an ordinary spring tide. There are two entrances to the docks, which is a very great advantage for the craft that will resort to it. Upwards of 2,250 yards of quays are now complete. A pier, 780 ft. long by 28 ft. wide, has been constructed to the east of the town of Old Milford, with 28 ft. of water alongside at low-water spring tide. This pier is connected with the South Wales Railway. Intimate knowledge of the locality leads us to anticipate very full traffic as likely to be attracted to this port, when the works in progress are completed. Its natural advantages are, taken all in all, without rival in the island, and when a vessel has left the entrance of the harbour she is not only alone in the open sea, but in the very centre of the maritime range of the whole world. That the American trade is likely to concentrate itself on Milford, when the accommodation in progress is complete, there are good reasons for anticipating.

The constructive feature which strikes us as the most novel is that the caissons, which close the opening of the docks, are made to traverse beneath rollers mounted in masonry, against which they are pressed by the water. We have not been favoured with a drawing of the caissons, so that we must reserve our comments as to the details. But the reversal of the ordinary mode of traverse, under the condition of the upward instead of the downward pressure caused by gravitation, strikes us as both ingenious and extremely suggestive. We have long been aware of the advantage of suspending large gates for yards, workshops, or engine-houses, and making the rollers which bear their weight run on an iron bar overhead. The constant injury done by stones and dirt to a set of bearing wheels and rail is thus avoided. In this plan, of course, the weight of the gate is the same, whether it be borne from above or from below. The enormous weight of a large dock-gate is neutralised by making it hollow. It is at the command of the engineer to make the caisson either slightly lighter or slightly heavier than its bulk of water. By adopting the former proportion the pressure is made to act upwards instead of downwards, and we conceive that the greater accessibility thus secured for the parts liable to friction will prove a practical advantage.

The rivulet which descends from Milford "pill" will supply enough water to make up for loss by lockage. The water in the haven and its affluents is so pure and free from suspended matter that dredging is unknown in the haven, and it is anticipated that an expense, which sometimes amounts to as much as 200*l.* per acre of dock per annum, will thus be entirely avoided at Milford. It is impossible, now that maritime commerce is seeking the most seaward points accessible by railway, instead of the most inland points accessible by river, that Milford can fail of a brilliant future.

BUILDING PATENTS.*

APPLICATIONS FOR LETTERS PATENT.

188. J. Parrott, Wallington. Warming and ventilating apparatus. Jan. 13, 1882.

199. J. F. Hoyne, London, and G. B. Lovedee, Birmingham. Stoves, &c. Jan. 14, 1882.

209. T. R. Shelley, Smethwick. Glazing greenhouses, roofs of railway stations, &c. Jan. 14, 1882.

225. W. R. Lake, London. Lighting apparatus. (Com. by J. S. Williams, Riverton, U.S.A.) Jan. 16, 1882.

237. M. Delmard, Plumstead. Window-sash fastener. Jan. 17, 1882.

258. R. G. Greig, Dalston. Stoves for heating and ventilating. (Com. by the Detroit Stove Works Co., Detroit, U.S.A.) Jan. 18, 1882.

261. E. L. Voice, London. Ornamentation of wall surfaces and ceilings. Jan. 19, 1882.

265. J. Westley, Chorley. Rollers and fittings for blinds, &c. Jan. 19, 1882.

276. T. Rowan, London. Ventilating water-closets, urinals, &c. Jan. 19, 1882.

283. A. M. Clark, London. Making trenches for drain-pipes. (Com. by Mr. M. E. Pidgeon, Sangerties, U.S.A.) Jan. 19, 1882.

NOTICES TO PROCEED

have been given by the following applicants, on the dates named.

Jan. 17, 1882.

3,972. S. C. Davidson, Belfast. Stoves or heating apparatus. Sept. 14, 1881.

4,065. W. White, Abergavenny. Building damp-proof walls, &c. Sept. 21, 1881.

4,085. C. H. Murray, London. Moulding clay for making bricks, tiles, &c. Sept. 22, 1881.

4,151, W. P. Thompson, London. Fireplaces and grates, &c. (Com. by J. M. Cook, Cincinnati, U.S.A.) Sept. 27, 1881.

136. J. A. Slater and M. M. Brophy, London. Gas cooking-apparatus. Jan. 10, 1882.

Jan. 20, 1882.

3,961. R. H. Reeves, Parkhurst. Construction of drainage, &c. Sept. 14, 1881.

4,010. J. Imray, London. Cooking-stove. (Com. by La Société des Spécialités Mécaniques Réunies, Paris.) Sept. 17, 1881.

4,803. W. Richards, Norwood. Apparatus for measuring water. Sept. 22, 1881.

4,620. H. T. Dawson, Chiswick. Cistern-valves. Oct. 21, 1881.

4,662, E. P. Alexander, London. Apparatus for heating baths, greenhouses, &c. (Com. by C. Martin, Paris.) Oct. 25, 1881.

ABRIDGMENTS OF SPECIFICATIONS

Published during the Week ending January 21, 1882.

4,121. W. Macvitie, Birmingham. Attaching and adjusting door-knobs to their spindles.

A square spindle is used with a trough on one side, in which is placed a spring with a tooth on its free end. This tooth engages a cross slot in the knob when it is passed on the spindle. (*Pro. Pro.*) Oct. 11, 1880. Price 2*d.*

* Compiled by Hart & Co., patent agents, 28, New Bridge-street, E.C.

2,442. J. L. Corbett and W. Lockhead, Glasgow. Taps or valves for regulating and controlling the supply of water, &c.

The supply of water is here regulated by a piston, which traverses a cylinder through which the water passes. These pistons close against seats to cut off the supply by the pressure of the water behind, and are opened by levers. June 3, 1881. Price 6d.

2,515. A. Pullan and J. R. Meiké, London. Taps or valves.

This invention consists in the use of a liner or seating, on which the valves work by expansion, contraction, or pressure, and is applied in a variety of different ways, which are described in twenty-one pages of specification, illustrated by 114 figures in the drawings, and stated in sixteen clauses, but which are not capable of being condensed. June 9, 1881. Price 1s. 2d.

2,539. M. Delnard, Plumstead. Chimney-top or cowl and ventilator.

This consists of a vertical pipe, whose upper end is enclosed in a perforated casing, and is provided with a flange or bell mouth, over which is a plate leaving a narrow aperture between the two edges. June 10, 1881. Price 6d.

2,555. A. Harvey, Glasgow. Water-taps or valves.

These are fitted with a ball of some slightly elastic substance fitting into a suitable seat, on which it is pressed down by a spindle. The pressure of the water underneath raises the ball and allows a free passage for the water when the pressure of the spindle is removed. June 13, 1881. Price 6d.

2,576. W. J. Hopkins, Worcester. Expanding and contracting fire-grates.

The side bars are arranged to slide backwards and forwards, thereby expanding and contracting the grate. (*Pro. Pro.*) June 14, 1881. Price 2d.

2,588. T. J. Gloerum, Christianssund, Norway. Locks, &c.

The chief feature of this is that the key is fitted with movable wards, which can move round the central stem a greater or less distance, whereby the picking of the lock is rendered more difficult. (*Pro. Pro.*) June 14, 1881. Price 2d.

2,605. W. T. Sugg, Westminster. Sun-lights.

Instead of placing the gas supply-pipe in the centre of the chimney by which the products of combustion are carried off, whereby the quality of the gas is deteriorated before it is used, the pipe is placed outside, and connected to one or more of the ribs of the framework of the lantern, which are hollow and serve as gas-pipes. The burners are connected with these ribs from below. June 15, 1881. Price 6d.

2,616. G. Hodson, Loughborough. Manufacture of chimney-pieces, columns, &c.

A plastic substance is made of cement and granite, iron slag, or broken stone, &c., which has been reduced to fragments. This substance is moulded to the required shape, and after being allowed to dry and harden it is painted, enamelled, and polished. June 16, 1881. Price 4d.

2,628. W. W. Beaumont, Camberwell, and J. Welman, Poole. Apparatus for dressing and cutting stone, &c.

A cutting or dressing tool is used, to which rapid vibratory motion is given by a small hammer, which is a piston working in a small cylinder driven by compressed air. June 16, 1881. Price 6d.

2,633. S. Hodgkinson, Manchester. Manufacture of window blinds.

The fabric is woven with dyed yarns. The desired pattern is printed on, and while the colours are moist it is passed through an enclosed chamber, in which gold and silver dust is caused to be agitated. June 16, 1881. Price 2d.

2,629. G. A. Wright, Portsmouth. Compositions for forming blocks for use in buildings, &c.

These blocks are formed of washed sand, breeze, Portland cement, lime, and loam, and may be used in buildings, both for walls and also as a substitute for wood. June 16, 1881. Price 6d.

2,636. G. J. Cox, Maidstone. Gas cooking and heating stoves.

These have closed bottoms, and the necessary air passes through heating spaces in the stove to the burners, which, therefore, consume thoroughly heated air, and an economy is effected. June 16, 1881. Price 6d.

The New Town-hall at Wandsworth.—The new town-hall at Old Wandsworth, which has been in course of construction for the past eighteen months, has been publicly opened. The new building, which has been described in our pages, is built of red brick. The public hall is 85 ft. long, 38 ft. wide, and 26 ft. high, and is lighted with two large sun-burners, with a stage or platform 20 ft. by 20 ft., and it is seated for 750 people. The entrance-hall, which is 18 ft. square, is paved with tiles. The other departments embrace a large vestry-room, 32 ft. by 20 ft., with general offices for parochial business. The architect is Mr. George Patrick, and the builder is Mr. Edward Parsons, of High-street, Old Wandsworth. The decorative carving work has been executed by Mr. Hosowski.

A NATIONAL HISTORY GALLERY.

SIR,—Your correspondent of the 21st has evidently leaped to his conclusions from merely reading the title and not the substance of my letter proposing the erection of a building to be entitled the "National History Gallery." I did not propose to collect historical paintings, but to employ living painters and sculptors to illustrate English history, in order that historical painting shall be encouraged in this country, and that there shall no longer be that dearth of historical pictures to which Mr. Standage alludes.

It is not a question about the housing of paintings already executed that I have attempted to discuss, but one touching the means for developing English art to its highest excellence,—a development which would carry with it the highest order of design in the manufactures, as the highest art did in all the great epochs. It is for mural or monumental painting that I seek to obtain grand fields for the exercise of the talents of English artists. Knowing what the history of art teaches upon this point, no English minister should hesitate to make a National History Gallery an accomplished fact.

Nevertheless, the gallery proposed might, in some architectural way, be associated with the above project. We require edifices which shall be entirely devoted to art purposes, to the embellishment of the metropolis, for we cannot depend upon buildings rigorously designed for the utilities of departmental purposes being æsthetic. There is possibly yet sufficient ground at South Kensington for a National History Gallery, and it is certainly high time, as your correspondent observes, that Mr. Geo. Scharf's anxieties should be diminished, and that the National Portrait Gallery should be housed in a safer and more appropriate building.

W. CAVE THOMAS.

INVADED BY ANTS.

SIR,—I, like "H. S.," am a victim to this terrible plague. My friends from Tyburnia to Notting-hill join me in my lamentations, being equally afflicted. Even Belgravia is not free; I have heard of a gentleman in Eaton-square offering a thousand pounds to the beetle destroyer if he could cure the evil. The last time I dined in the Cromwell-road, I saw some of these creatures indulging in frolicsome antics on the table-cloth; they were, doubtless, brought in by the pastry cook. I had occasion in the autumn to stay at an hotel in the fashionable part of London. At breakfast the sugar-basin was full of these detestable little wretches. I called the waiter's attention to it, and he said, "It is very bad, sir; but you should see the ——" (naming another fashionable hotel). "I have just left that, and the ants are much more numerous than with us." I started off for Brighton, and at an hotel there I found the sugar-basin exhibiting the same evidence of vitality. Some time ago I wrote to the *Times* on the subject; but I elicited no practical remedy. Something must be done, or London as a place of residence will be quite unendurable.

Before I went to the meeting of the British Association at York, I called on an old lady and told her I was going. She said, "Nonsense, what good do you ever do?" I tried to point out the advantages of meeting. She exclaimed, "Psha! it is all very well for Sir John Lubbock to make an oration about the advancement of science, but until he can tell me of something to rid me of the plague of ants, with which I am pestered, nothing will ever make me have faith in him or your fine science, more especially as these creatures are his pets, and I believe he encourages them. I recollect what the grocer said when I asked him for something to kill black-beetles. He replied, 'I could easily prescribe something, if I knew their language, for I am sure they tell each other.' Sir John Lubbock cannot plead this excuse."

I was not fortunate enough to see Sir John Lubbock at any of the Sectional Meetings, or I would have told him the anecdote, and besought a remedy.

To mitigate the woes of "H. S." I recommend the frequent and liberal use of *carbolic acid*. The creatures like warmth and moisture. Every approach to the supply cistern and top of the boiler (every night they hold their Parliament there) should be sprinkled with the acid. I go round with my servant and syringe every hole from which they emerge in single file. The tables and dressers are submitted to the same treatment. The smell of the acid is very disagreeable, and though the servants sometimes complain they prefer the annoyance of that to being overrun with these detestable little insects. "H. S." will find that this course will circumvent them considerably. I do not say it will exterminate them; that must be left to Sir John Lubbock, "who knows their language," unless he pleads that, being a different species to those he cultivates, they have another dialect with which he is unacquainted.

F. S. A.

SIR,—Apply with a brush a hot strong solution of alum to every chink or crevice infested; two such dressings will probably suffice to destroy the nests. Another plan is to pour some turpentine into a large flat dish and set light to it, and let it burn where the ants are most plentiful; this should be done for two or three days in succession, and then "H. S." will not be visited by any more ants, at any rate for a time. But now that he has made his basement dry by laying down concrete, it will probably not be very long before other ants make their appearance.

CHARLES F. MOXON.

THE USE OF THE HYPHEN IN COMPOUND WORDS.

MR. R. RAWLINSON'S letter "On a Proper and Full Use of the Hyphen in Compound Words in Engineering Reports," which appeared in your issue of the 7th inst., calls attention to a subject which has a certain importance for those even who are outside the profession of which the writer of the letter is so distinguished a member; and it is for this reason that I have ventured to trouble your readers with a few observations thereon.

Years ago it was customary to leave to the printers the insertion of the necessary punctuation marks, hyphens, &c., the author being too much engrossed with the more important work of embodying his ideas in intelligible and grammatical form to attend to such comparative trivialities as these were then looked upon to be. When a work of a technical character was placed in the hands of the compositors, it was customary for them to consult with their "reader," and draw up a list of words in which the hyphen should be used, and those which should be printed as one word. This plan, though perhaps open to objection by the hypercritical, was generally successful in insuring uniformity in a work. After the author had returned a few proofs for press, the compositors were able to ascertain his wishes in regard to compound words, and if they did not happen to "square" with their own notions, the necessary alterations were made in the list. In this way compositors, "reader," and author were placed *en rapport* with each other; printer and publisher were alike satisfied; and public taste was not outraged,—at least, no howl of indignation, so far as I am aware, was ever heard at the existence of this system. But, *tempora mutantur!* While the public have become more critical, printing "offices" have degenerated into "works," and the "hands" employed therein are of different mental calibre to their forefathers. "Follow your copy" is the order of the day; and hence the necessity that those who produce this "copy" should so write it that nothing is left to the judgment of the "hands" who put it in type.

It is about twenty years since I made an attempt to deal with the discrepancies now pointed out by Mr. Rawlinson, being at that time engaged on works in which a number of technical words were used, and I found that the following rule, although far from being without exception, was useful in practical every-day work:—Where two *substantives* are employed to describe one thing (the former indicating the object or purpose of the latter), the hyphen may be used when the two words joined thereby do not together exceed four syllables. For example, gas-pipe, *i. e.*, a pipe *for* gas. According to this rule, the words "iron-cutter" would mean a tool, probably made of steel, *for* cutting iron; but an "iron cutter" would be a tool made *of* iron, and used for cutting some other material. I do not think it well to compound long words, and therefore I restricted the number of syllables to four. For example, an "oil-barrel" follows the rule and does not offend the eye; but "petroleum barrel" would be a rather ugly-looking compound. Again, "gas-fitter," "boiler-fitter," but "pianoforte manufacturer."

As to uniformity, this is often affected by the position of words in a sentence. For instance, I should say, "I dine every day"; but, "My dining is an every-day occurrence." Here there is unquestionably a lack of strict uniformity; but how is it to be avoided? Suppose I am talking about the works of the much-abused gas and water companies, I shall say probably (in print) the London gas-works and the provincial water-works; but how am I to say the provincial gas and water works? Am I to follow the German plan, and tack a hyphen on to the word "gas" (gas-) and then hyphen water-works? or am I to follow the Parliamentary printers' plan and make waterworks one word? or, better still, leave out the hyphen altogether?

Mr. Rawlinson specifies the word "rain-storm." I think all "storms" are printed as one word now; but "waters" are generally hyphened; and as double compounds are to be avoided, I should say "rain-water tank," "storm-water drain," rather than "rain water-tank," or "rain-water-tank;" also "soda-water bottle." Then as to "cess-pool" and "sub-soil," these should be one word. As a rule the prefix *sub* is hyphened only when the word to which it is attached is a long one,—as sub-commissioner, sub-inspector, &c.

As to terms used in patent specifications, they are simply distracting. I recently met "electric-lighting. Gas-lighting (*i.e.*, lighting *by* gas), as a compound, one can understand; but lighting by electric is too much. Again, we find gas-motor engine, gas motor-engine, and gas motor engine. I could give many other instances of the irregular use of the hyphen, but should probably only weary your readers by so doing. I will only say, in conclusion, use the hyphen sparingly; when once you begin to employ it you scarcely know where to stop. I think it much the best plan to omit it to a very large extent, and to what extent must, like the orthography of the name of the immortal Weller, depend much upon the "taste and fancy" of the writer. I remember once having to prepare an index of patents that literally bristled with words that, strictly speaking, should have been made compounds; but such confusion arose as to when to use and when to omit the hyphen, that I made a clean sweep of them all, to the delight of the compositors and the everlasting peace (as far as this work was concerned) of the printer's "reader."

X. Q. S.

THE SMOKE NUISANCE.

WRITING this in the noon-day, by artificial light, in a darkness which may be "due to unconsumed carbon and not to fog proper," but appears really to be an unfortunate mixture of both—while one is willing to admit that the efforts of the Kyrle and National Health Societies towards fog and smoke abatement are highly meritorious, one apprehends that neither the present nor the rising generation will witness very striking results, and is disposed to inquire "is such life worth living." Referring to the slow rate of sanitary progress it was remarked by myself some time since that "what is really wanted is instruction in cheaper and easier methods of sanitation than those recommended by rival inventors, and a little common-sense on the part of the public" (*Sanitary Record*, Jan. 4, 1878),—and the same applies to the treatment our fire-places.

For the last quarter-of-a-century I have noticed that, as winter-time approaches, suggestions are made to the public, through the press, for the economy and more perfect combustion of fuel, all of which I have tried and thrown aside for the more simple and perfect plan I now adopt. I found, on lighting fires at the top, there was no cheerful fire at breakfast-time, when most wanted, and, when least required, an incandescent mass, to which fresh fuel had afterwards to be applied in the usual way. I tried metal and fire-brick bottoms, both perforated and not; these, more or less, cut off that necessary factor of a good fire—a plentiful supply of air, *i.e.* oxygen. I tried the admixture of coal and chalk, and, more than twenty years ago, the combination of coke and gas—now revived as a novelty—and found the necessary "pricker" most effectually spiked the gas-holes, slowly but surely blocked by the heat and dust, and that the coke, of course, had to be almost hourly renewed; this was soon replaced by a gas fire-place, the flue of which, being provided with an exhaust cowl above and plenty of fresh air below (since a patented "system of sanitation!), is eminently satisfactory. Anthracite, which I have lately tried, produced more heat from temper than from coal.

I have carefully inspected the interesting collection at South Kensington and at the late Sanitary Exhibition at Brighton. Many of the inventions, so sedulously attended to, are unquestionably excellently adapted to the wants of the largest coal-burning city in the world, but it must be remembered that all this array of ingenious contrivance is not the outcome of the present movement, and that all their advantages have been allowed to lie dormant in the past so far as any general adoption, except some "Rari nantes in gurgite vasto," and such, it is to be feared, will be their fate in the future, unless the Societies who have been instrumental in bringing together the collection can realise the inauguration of an enlightened public opinion, or can induce the Government to take up the question, apart from which, indeed, considering the intense apathy of the public, it may be conjectured to how many of the existing million of fire-grates in London alone will any remedy be applied. A new and important feature of the Exhibition is that all competitive stoves, furnaces, and fire-places are to be subjected to a really careful and thorough examination as to their various capabilities.

Doubtless close stoves are more likely to consume smoke than open fire-grates, but at the necessary sacrifice of important and vital ventilation provided by open fire-places said to be wasteful (?) of heat, in this respect comparing favourably with stoves, whether of china-ware or metal. Even in the draughty arcades of South Kensington one is struck by the sensation of baked devitalized air, and sighs for a tankard of the genuine article outside. Besides, an Englishman is not likely, without a strong protest and lively struggle, to give up the cheerfulness and companionship of his open fire-place, where he can "chew the food of sweet and bitter fancy" over its ever-varying aspect.

Under these circumstances I venture to describe the plan now used in the same old-fashioned grate, in which all these above-mentioned experiments have been tried. The fire, of the best bituminous coal, is to be *well* lighted in the usual way, with a small dry country faggot, in the vernacular "bobbin," or amply resinized wheel; two *large* fire-clay balls being placed on the bottom of the grate, so as to keep the material raised and to allow all possible access of air; the top should be touched *as little as possible*, in fact, the poker should be hidden, else some conceited intruder, who fancies he knows more about fires than anybody else, may violently stir it up and throw on half a scuttle-ful of coals—the usual plan; feed the fire through the bars with the shovel; there is one to be seen at South Kensington—patented, of course!—the larger lumps being judiciously placed by small hand-tongs now made for this purpose. A block of ship-timber should be placed on the top as occasion requires. A cheerful Turneresquely-tinted fire, with little or no smoke, is the result.

P. HINCKES BIRD, F.R.C.S.

HEAT.

HEAT may be considered as one form of energy, action, or motion, incapable *per se* of combining with gases or solids; therefore, to consider heat in a comparative sense of purity is absurd. The action or movement set up by heat in expanding the molecular constituents of bodies sets free the foreign elements or impurities contained in them. The evolution of these gases thus explains the phenomena of the disagreeable odours emitted by some kinds of stoves; the iron of which such stoves are formed is commonly of a very inferior character, and consequently the foreign elements becoming gaseous by expansion (the result of heat), and the molecules of the iron expanding, and the iron becoming more porous, the imprisoned gases are thus set free. If the iron were *pure* (*e.g.*, in the form of steel) the evolution of odorous gases would not occur.

Hard-burnt fireclay, tiles, or bricks (owing to the high temperature requisite to fuse the silicate constituent contained in them) are most suitable for encasing stoves. The heat of an ordinary stove would be far below the temperature requisite to dilate or expand the molecular constituents of the hard-burnt fireclay or terra-cotta. For stoves or pipes used for the transmission or radiation of heat energy, the *purest* iron should be used.

The writer agrees with one part of Mr. Leeds's article, *e.g.*, that surfaces of mild temperatures uniformly distributed over the rooms are the most satisfactory; but such a system of warming is impossible with the ordinary coal fire; its position at one side of the area to be heated precludes the possibility of uniform radiation.

The American stove, situated in the centre of the space to be heated, is the system worthy of emulation, and could by very little attention, be made to combine (even to a greater degree) all the comforts, minus the discomforts, of the open and sometimes smoky fireplace, and the American stove is far more economical, theoretically perfect, and effective in action. By its adoption to all households (an easy matter) a great step towards the solution of the vexed question of smoke abatement and prevention would be attained. The stove, under the hands of a true artist, can be made quite as (if not more) beautiful than the ordinary open fireplace.

B. H. THWAITE, F.C.S.

SKILLED LABOUR AND ITS TESTS.

SIR,—I have read with interest the letter from "A Clerk of Works" on "Skilled Labour" in your issue of the 21st inst. As I have a great deal to do from day to day with various classes of workers, half-workers, and no workers, I should be glad to suggest in your columns the possibility of a system of industrial certificates being some day arrived at. I am well aware that the "Livret" system is very unpopular and distasteful to the English "working men"; but, under existing circumstances, there is no criterion of workmanship, mere membership of a trade union, for instance, being by no means an infallible test, however strict may be the rule that only indentured tradesmen are enrolled. If some experienced men in the several departments of the building trade were to be accepted as an examining board, issuing certificates or diplomas of competence, we could at any rate roughly gauge the comparative knowledge of workmen offering themselves to employers and their agents.

I suspect at the present time the motto, *Palmam qui meruit ferat*, is too often superseded by a rule that he who brings "palm oil" takes the palm. But on this point it might be indiscreet to write without fuller knowledge. I will content myself with the general suggestion that some sort of diploma should gradually be introduced. By the bye, where is the Trades Guild of Learning, and what is it doing in this direction?

ALSAGER HAY HILL.

Central Labour Exchange.

COMPENSATION CASE.

GUILLET *v.* THE VESTRY OF KENSINGTON.

THE case was heard some time ago, the claimant being represented by Mr. Philbrick, Q.C., and Mr. Smith, instructed by Messrs. Shaw & Co.; and the Vestry by Mr. Littler, Q.C., and Mr. Freeman, instructed by Messrs. Pontifex. The surveyors were Mr. Cooke Baines, of Finsbury-circus, and Mr. Reid. The property is the copyhold of the Manor of Kensington, held at a quit rent of 3d. per annum, and a fine certain of 6d. on alienation, and consists of a small shop and dwelling-house, No. 5, High-street, Notting-hill, being required by the Vestry under their Improvement Act of 1880. The frontage is a little over 12 ft., by a depth of 48 ft. Mr. Baines dealt with the property as freehold in possession, estimating it to be worth, after an expenditure of 60*l.*, a rental of 70*l.* per annum, which at twenty years' purchase gave 1,400*l.* He deducted 60*l.* for repairs, leaving 1,340*l.*; and adding 10 per cent. for compulsory sale, 134*l.*,—the total was 1,474*l.* From this a deduction of 30*l.* or 40*l.* would have to be made for enfranchisement. Mr. Reid put the value of the premises in their present condition at 65*l.*, which he took at twenty years' purchase, 1,300*l.* Adding 10 per cent. for compulsory sale, the total of his figures was 1,430*l.*, subject to the cost of enfranchisement. On behalf of the Vestry, Mr. R. Vigers put the rental value at 40*l.* per annum. This he took at twenty years' purchase, 800*l.*; and less 50*l.* for enfranchisement, 750*l.* He then added 10 per cent. for forced sale, making a total of 825*l.* Mr. Rogers (Rogers, Chapman, & Thomas) corroborated Mr. Vigers's figures. The arbitrator, Mr. Geo. Pownall, has recently awarded the claimant 1,000*l.*

INJUNCTION TO STOP ERECTION OF NEW WALL IN FRONT OF PARTY-WALL TILL IT HAD BEEN REPAIRED.

PHILLIPS *v.* THE FIRST AVENUE HOTEL COMPANY.

IN this case, which came before Vice-Chancellor Hall on Saturday last, the plaintiffs are tailors, carrying on business in premises in Holborn, situate at the corner of Warwick-court, opposite to Chancery-lane, and they sought to obtain an injunction restraining the defendants, who are erecting a large hotel on the north side of Holborn, between Warwick-court and Brownlow-street, from breaking into and interfering with the plaintiffs' party-wall, and from erecting any adjoining wall, until the plaintiffs' wall had been sufficiently repaired and strengthened to bear the increased weight. The plaintiffs' complaint was in substance that the defendants in constructing their works had pulled out timbers so as to leave a hole 1 ft. deep in the plaintiffs' wall, and had also taken away a chimney-breast, thereby weakening the plaintiffs' wall.

Vice-Chancellor Hall, being of opinion that he had no jurisdiction to grant a mandatory injunction upon an interlocutory application, refused the motion, upon an undertaking by the defendants to fill up the holes made by them, and not otherwise to break into or interfere with the plaintiffs' wall.

No time was lost in bringing the case before the Court of Appeal, where, on Monday last (before the Master of the Rolls and Lords Justices Brett and Holker), the order of Vice-Chancellor Hall was discharged, upon an undertaking by the defendants, within a week, to tie the independent wall to the party-wall at the base, and not to carry up the independent wall any higher until the work had been approved by the district surveyor, with liberty for the plaintiff's surveyor and architect to inspect the work. The costs to be costs in the action.

STAINED GLASS.

Bradford.—Two stained glass memorial windows, of two lights each, have just been added to St. John's Church, Bradford (Yorks), the one being a "Buckley" and the other a "Pullan" memorial. They occupy one of the four-light windows, and complete the larger series on the south side. The subjects were selected from incidents in the lives of SS. Peter and Paul. They are respectively Christ walking on the Sea and inviting Peter, the Lord's Charge to Peter, the Conversion of Saul, and Paul Preaching at Athens. The colouring is in rather a subdued tone. The tracery lights contain angels bearing ribands inscribed with texts. The windows are by Messrs. Powell Bros., Leeds, by whom also other windows in the church were executed.

Leeds.—The district parish church of Hunslet has just received an addition in the shape of a stained glass window in memory of the late Dr. Gisburn. The window is of two lights, each divided into two compartments. The subjects illustrated are four of the specified "acts of mercy." In the tracery lights are blazoned the armorial bearings of the ancient Yorkshire family of "Gisburn," territorially deriving from the old priory of that name, and the root of the Gisbornes of Staffordshire, Derbyshire, &c. The window is by Messrs. Powell Bros., Leeds.

CHURCH-BUILDING NEWS.

Liverpool.—The Church of St. Jude, Hardwick-street, Liverpool, has been re-opened, after having been for some time closed in order to effect certain alterations and improvements in the fabric. The church is one well known to the older inhabitants of Liverpool as being the church of Dr. M'Neill. Before the work was taken in hand the east end was crowded by organ, pulpit, and desks, and the body of the church made not only ugly but unpleasantly stuffy by long, low galleries. There was no convenient vestry,—in fact, nothing which could give convenience to service or dignity to worship. By the clearing out of the chancel, by the introduction of a circular window at the east end and a new chancel arch, by the removal of the side galleries, which cast such a gloom over the interior of the church, and by the tinting of the walls, a pleasing transformation has been effected. The architect under whose direction these works have been carried out is Mr. James Brooks, of London.

Winsford.—The Winsford Weaver Navigation Church may fairly be taken as an evidence of the serious subsidence which takes place in the salt districts of Cheshire. This church, which was erected less than forty years ago (the late Mr. Edmund Sharpe, of Lancaster, being the architect), has had to be taken down; and we hear that the River Weaver Trustees have instructed Mr. Richard Beckett, of Hartford, to re-erect the same. It is stated that the structure will be built on the same foundations as before, using the old roof, seats, and fittings; but the walls are now to be built on the half timber principle, of strong timbers filled in with brick work on lifting beams, so making provision for lifting in case of any future subsidence. Mr. Beckett has recently lifted the Town Bridge a height of 4 ft. 6 in., under the direction of Mr. Stanhope Bull, the county surveyor. The Town Hall (with five shops, a corn warehouse, &c., attached) was also lifted by the same contractor, about two years and a half ago, a height of 8 ft. 6 in.

Books.

The Level of Hatfield Chase and Parts adjacent. By JOHN TOMLINSON.

THIS is a good specimen of the kind of topographical and archæological record which, as a general rule, is only accomplished by the enthusiasm of some one devoted to the subject, and willing to expend time and money on it without consideration for any commercial return. The neighbourhood here treated of is not the Hertfordshire Hatfield, most familiar to dwellers in the South of England, but a level piece of country near Doncaster, the drainage of which forms a great part of the subject of the history, as also of previous histories written but not printed; for Hatfield Chase seems to have been an interesting district to antiquarian students for some time past.

There is a great deal of matter as to the history of the families and properties included in the area treated of, which will be of interest to those more especially who are living near or connected with the neighbourhood, and which appears to be followed out with a degree of completeness and attention to accuracy which will establish the book as an indispensable volume of reference in connexion with its special subject. A chapter is devoted to Hatfield Church, which, though founded at an early date, appears, from the view given, to be now a Late Perpendicular church, not of very high interest architecturally. The great fact in connexion with the district was, however, the undertaking of draining it, a great part of the land being so near the sea level as to have been, within historical periods, subject to submergence at high tides. The artificial embanking of local rivers has rendered a considerable portion of land capable of cultivation, though below the level of high water in the Humber and the Trent. The author mentions some facts illustrating the great and recent changes in the sea line in this part of the Englisho oast. "Ravenspurn was a noted port and town, more important once than Hull. It sent members to Parliament in the reign of Edward II. . . . . and in 1471, Edward IV. made from hence his noted passage to York. For centuries before this latter period there had doubtless been a gradual wasting of the land, and now the deep waves have usurped dominion over the entire site of Ravenspurn. Two churches, those of Kilnsea and Withernsea, have been also swept away, the sea flowing where those sacred edifices once stood. It is needless to ask where the *débris* has gone to; 'Trinity Sands,' 'Sunk Island,' 'Read Island,' &c., will answer. The very bed of the Humber itself is constantly undergoing change, so that a pilot can scarcely tell, after one moon's tides, where the navigable channel is to be found. A large proportion of this mud or 'warp' finds its way by the Ouse and Don into this district of Hatfield Chase; and were it not for the violent freshets after heavy rains, which come down from the hills above Doncaster, scouring out the river bed, the latter river would long ere this have lost its identity." The author adds in a note that it is common to see in old maps such indications as "here stood Auburn, washed away by the sea," "Hartburn, washed away by the sea;" that formerly Hornsea was ten miles from the sea, which now comes up to the town, and has quite extinguished the village of Hornsea Beck.

The history of the drainage of the district is then traced, the problem having been forcing itself on attention from an early period, though the dwellers in these half-submerged districts were by no means favourable to great drainage schemes, which they regarded as disturbances of the retired tranquillity of their lives. The great drainer and reformer of the district was Vermuyden, an eminent Dutch merchant in London, who entered into a contract with Charles I. to drain the land, on consideration of receiving one-third of the reclaimed land as his property. He brought over workmen from his native Holland, accustomed to similar engineering tasks. The Level was chiefly inundated by three rivers, the Don, the Idle, and the Torn. Vermuyden's plan was to cut straighter and more capacious watercourses and then fill up or silt up the old channels. The history of the progress of the scheme, and of the disagreements it led to, is of some interest; but we must refer the reader to Mr. Tomlinson's pages for further information.

Only a limited number of copies of the work have been printed, some for presentation to libraries and some for sale. The latter can be obtained through Messrs. Wyman & Sons. The book is illustrated with maps of the district.

The Whole Art of Marbling. By C. W. WOOLNOUGH. London: Geo. Bell & Sons. 1881.

NOT marbling as applied to the decoration of buildings, but as applied to paper, book-edges, and so on. It gives a good practical account of the materials used, and the way of using them in every kind of marbling practised. This book has been long before the public; the first edition obtained a commendatory letter from the late Professor Faraday (whom it interested because of his own early occupation as a bookbinder, and because of the principles of natural philosophy it involves), and the author since then has applied himself to make it more and more complete. The present edition includes a large number of specimens produced by this "pretty, mysterious art."

VARIORUM.

THE first volume, now completed, of "The Universal Instructor, or Self-culture for All," issued by Ward, Lock, & Co., Salisbury-square, makes a portly book brimful of information at comparatively small cost. Any young men or young women backward in their reading, who would give steady study in their leisure time to its contents for six months, would find the time well spent.——"Saker's System of Builder's Bookkeeping," by Sydney Saker (Cassell & Co.), appears to be the result of practical experience. The writer's object is to introduce a satisfactory system of keeping accounts by double entry. A good set of books is a prime necessity in a builder's establishment.——"Lessons on Form for the Use of Teachers and Pupils in Elementary Schools," by R. P. Wright (Longmans & Co. 1882), is, in truth, an elementary treatise founded on Pestalozzi's system of teaching geometry, and we quite agree with the author in saying that the lessons given will be found to cover a good deal of ground. Mr. Wright is the teacher of mathematics in University College School, London.——"Steam Heating for Buildings, or Hints to Steam Fitters," by W. J. Baldwin, Steam-heating Engineer, is an American book, which describes pretty fully steam-heating apparatus for warming and ventilating private houses and large buildings. It does not carry the subject beyond every-day work, but will be found instructive by many. A detailed specification is introduced as an Appendix, to familiarise the reader with an ordinary form of steam-heating work. Messrs. Trübner & Co. are the London publishers.——"Toys and Toymaking," by Jas. Lukis, B.A., is one of the little books issued from "The Bazaar" Office, 170, Strand (1882). It goes minutely into the subject, the part now before us treating of clock-work, steam, and electrical toys.——We are not surprised that a fresh edition of "At Home" (published by Marcus Ward & Co.) has been called for. Cleverly illustrated by J. G. Sowerby, and quaintly decorated by Thos. Crane,—the verses characteristic and fitting,—it is just the book to delight the little ones,—and the bigger ones too.—— "Real Whitby Jet" will form the subject of a descriptive and illustrated paper in the February number of *Cassell's Magazine*. The drawings for the paper have been specially taken in one of the largest jet manufactories in Whitby.

Miscellanea.

Protection from Fire.—A practical experiment in the application of revolving sprinklers to the protection of theatres from fire was tried a few days ago in New York, in the presence of two of the Fire Commissioners. According to the *American Architect*, the arrangement was devised by chief engineer McCabe, and consists simply in a series of revolving nozzles, like the lawn-sprinklers in common use, supplied by tanks over the stage, and set so near together that the showers from them will intersect, completely drenching everything under them, while the whole can be controlled by a single valve at any part inside or outside of the theatre. For trial, a space in West Third-street, under the Elevated Railway tracks, was selected to represent an imaginary stage, and four sprinklers were attached to the underside of the railway trusses above, and supplied through a hose by a steam fire-engine, throwing 600 gallons of water per minute. In less than a minute after the signal was given, the space representing the stage was flooded with water, to the great satisfaction of the Commissioners, who perceived at once the efficiency of such an apparatus in checking a conflagration. A similar arrangement has been brought forward in England more than once, but seems never to have made way.

Insecure Mantelshelves.—An inquest was held on Monday by Dr. Danford Thomas on the body of a little girl, nine years of age, who died from the effects of burns caused by a lighted paraffin oil-lamp falling upon her through the giving-way of a mantelshelf on which the lamp was placed. The child, it seems, had hold of the mantelpiece, which does not appear to have been properly fixed. The jury, in returning a verdict of "accidental death," expressed the opinion that the builder was guilty of great carelessness, and that the attention of the district surveyor should be called to the circumstance. What the district surveyor could do in the matter, unless, possibly, by taking proceedings under the Ruinous Buildings clauses, is not very clear.

The Proposed Statuary for Blackfriars Bridge.—Attention is called to the length of time that has elapsed since this competition was instituted, and questions are being asked as to what has been the fate of the models sent in by the competitors. As we stated some time ago, the adjudicators were not able to recommend any of the models for execution, and it was referred to a committee to consider what further steps should be taken. Mr. James Edmeston, C.C., lately submitted a motion to the effect that a fresh competition be initiated, but by request he withdrew it, pending the report of the committee.

The Water-Gate of York House.—Something is at last to be done to rescue this neglected structure from its half-buried condition. At the meeting of the Metropolitan Board of Works on the 20th inst., it was resolved "That the contour of the ground in the Victoria Embankment Gardens, near the York Water Gate, be altered, so as to afford a better view of that structure, at an estimated cost of 15*l*." In the course of a brief discussion on the subject the hope was expressed that the owners of the structure would follow up the action of the Board by taking steps to arrest the further decay of the stonework.

No. 90, Camberwell-road: "Camberwell Chambers."—These premises, used as a lodging-house for single men, are being enlarged by the addition of a new wing, approached from the old portion through a covered way, and giving accommodation for upwards of 160 extra beds, with lavatories, bath-rooms, washing and drying rooms, &c., and a large kitchen, 58 ft. by 26 ft. The new buildings will be completed in a few weeks, at a cost of something over 3,000*l*. Mr. G. St. Pierre Harris is the architect, and Messrs. Taylor & Parfitt are the builders.

The Sunday Society.—The attendance at the Winter Exhibition of the Society of British Artists, on Sunday, January 22, 1882, was unusually large. During the three hours the Exhibition was open the Gallery was crowded, the total number of visitors being 1,822.

Proposed Enlargement of Chelsea Workhouse.—We have received some letters objecting to the interference with the architect's plans (after their acceptance by the Board of Guardians), at the suggestion of a member of the Board not present when they were approved

New Brompton, Kent.—A new Wesleyan chapel has recently been erected by Messrs. Naylar & Son, of Rochester. Mr. M. H. Pocock, of Queen Anne's Gate, Westminster, is the architect. It is planned to seat about 800 persons, and has cost about 2,000*l*. It is seated throughout with open deal benches, stained and varnished. The heating apparatus has been provided by Mr. Grundy, and the pulpit executed by Mr. H. Hems.

Lewes Fine Art Exhibition.—One article on show at the forthcoming exhibition will be a model of a section of the new breakwater now in course of construction at Newhaven, measuring about 5 ft. in length, 2 ft. 6 in. in width, and 2 ft. 3 in. in height. This model is kindly to be lent by the Newhaven Harbour Company.—*Sussex Advertiser.*

TENDERS

For coach-house and stables, Portland-square, Bristol, for Mr. Ford. Mr. W. Cloutman, surveyor:—

	No. 1.	No. 2.—Extra.
W. Church	£383 0 0	... £26 0 0
W. Cowlin & Son	275 0 0	... 25 0 0
H. A. Forse	273 0 0	... 24 0 0
W. Vea's	254 0 0	... 23 10 0
T. Hill	249 0 0	... 26 0 0
Hayes Bros.	247 0 0	... 25 0 0
Eastabrook & Sons	246 0 0	... 28 0 0
Thos. Young	223 0 0	... 25 0 0

For building seven houses and shops, Brixton-road, for Mr. Earle Bird. Messrs. Fowler & Hill, architects. Quantities by Messrs. Fowler & Hugman:—

Pack Bros.,* Brixton	£9,500 0 0

* Accepted.—No competition.

For alterations to business premises, Western-road, Brighton, for Mr. W. Hetherington. Quantities supplied by the architect, Mr. Henry Branch:—

Repairs.	
R. Holloway	£540 0 0
G. E. Garbutt	474 8 6
Ide & Son (accepted)	379 0 0
Brass Shop Front.	
Drew & Cadman	138 0 0
Dyson & Co.	134 0 0
J. Holsaer (accepted)	118 0 0
Shop Fittings.	
Prebble & Son	589 0 0
G. Colls	370 0 0
Wm. Salter (accepted)	315 0 0
Gas Fittings.	
Packham	167 0 0
Green (accepted)	130 0 0

For repairs to the roof of St. John the Evangelist Church, East Dulwich. Mr. A. Burt, architect:—

Burman	£271 0 0
Mitchell	156 10 0
Stevens	103 0 0
C. Goad (accepted)	92 0 0

For the erection of studios and chambers, Bedford-gardens, Campden-hill. Mr. R. Stark Wilkinson, architect:—

Perry & Co., Bow (accepted)	£3,300 0 0

For detached residence, Norfolk-road, Carlisle. Mr. Geo. Dale Oliver, architect. Quantities by the architect:—

George Black, Carlisle	£1,300 10 0
C. & J. Armstrong, Carlisle	1,275 0 0
W. Court, Carlisle	1,239 0 0
H. & R. Court, Carlisle	1,231 0 0
R. Little, Carlisle	1,215 10 0
Jos. Irving, Carlisle	1,208 15 10
Jos. Bell, Carlisle	1,201 5 0
Batey & Forster, Carlisle	1,198 0 0
J. & W. Laing, Carlisle (accepted)	1,183 0 0
John Reed, Carlisle	1,149 13 0

For the erection of five cottages, at Enfield, for Mr. S. Lynes:—

		Allow for Old Material.
Coote, Enfield	£675 0 0	... £15 0 0
Richards, Enfield	649 0 0	... 10 0 0
Ranson, Enfield	649 0 0	... 10 0 0
Boswell, Enfield	639 0 0	... 7 10 0

For boiler-house, stove, &c., Great Freeman-street, Nottingham, for Messrs. Wright & Mulholland. Mr. Herbert Walker, architect. Quantities by the architect:—

Beel & Son, Nottingham	£346 0 0
Enoch Hind, Nottingham	282 0 0
Bains & Turton, Basford	256 0 0
J. F. Price, Nottingham (accepted)	230 10 0

For alterations and additions to house and shop, Basford, for Mr. Arthur Pearson. Mr. Herbert Walker, architect. Quantities by the architect:—

S. Ingham Basford	£223 0 0
G. Hopewell & Son, Basford	221 15 0
Bains & Turton, Basford (accepted)	220 0 0

For the erection of the City of London College, Whitestreet and North-street, Moorfields. Mr. E. A. B. Crockett, architect. Quantities by Mr. J. Farrer:—

Outhwaite & Son	£14,642 0 0
Philps & Bisiker	14,485 0 0
Bangs & Co.	14,350 0 0
J. Harper	14,336 0 0
Jones & Co.	14,145 0 0
R. Conder	14,145 0 0
J. & J. Greenwood	14,043 0 0
Scrivener & Co.	13,985 0 0
Ashby & Horner	13,970 0 0
Ashby Bros.	13,730 0 0
W. Brass	13,655 0 0
Rider & Son	13,448 0 0
E. Morter	13,273 0 0
E. Lawrance	13,040 0 0
J. T. Chappell (accepted)	12,988 0 0

For new premises, Falcon-lane, Battersea. Mr. H. I. Newton, architect:—

Burman	£1,397 0 0
Steel Bros.	1,375 0 0
Lamble	1,367 0 0
Haycock	1,309 0 0
Gill	1,297 0 0
R. & H. Pickersgill	1,228 0 0
Williams	1,106 0 0

For the supply of 160 cast-iron posts, for the Maidstone Urban Sanitary Authority. Mr. J. S. Anscombe, C.E., surveyor:—

	Each.
Darling	£1 2 9
Baylis & Co.	1 0 8
Beck & Co.	0 19 7
Hill & Smith	0 19 6
Richardson & Co.	0 18 6
Rowell & Co.	0 17 9
Weeks & Co.	0 17 6
Garrett & Co.	0 15 0
Shrubsole	0 14 10
Noakes & Co.	0 14 3
Jukes, Coulson, & Co.	0 13 6
Birtley Iron Company	0 13 0
H. Wurr & Co. (accepted)	0 12 6
Firmstone & Son	0 11 8

For the supply of 160 wrought-iron tubes, for the Maidstone Urban Sanitary Authority. Mr. J. S. Anscombe, C.E., surveyor:—

	Each.
Garrett & Co.	£0 6 4
Firmstone & Son	0 6 0
Rowell & Co.	0 5 6
Shrubsole	0 5 5½
Baylis, Jones, & Co.	0 5 3
Birtley Iron Company	0 5 0
Hill & Smith	0 4 4
Richardson & Co.	0 4 3
Weeks & Co.	0 4 0
Jukes, Coulson, & Co.	0 3 9
Noakes & Co.	0 3 6
Beck & Co.	0 3 5
H. Wurr & Co. (accepted)	0 3 4
Darling	0 3 1

For new market-hall, Burton-on-Trent. Messrs. Dixon & Moxon, architects. Quantities by the architects:—

Chamberlain Bros., Burton-on-Trent (accepted)	£10,312 0 0

For additions to the Firs, at Warplesdon, for Mr. J. W. Baxendale. Mr. C. F. Hayward, architect:—

		Wainscot.
Higgs & Hill	£4,434 0 0	... £320 0 0
Dove Bros.	4,375 0 0	... 375 0 0
Boyce	4,090 0 0	... 350 0 0
Lawrence	3,718 0 0	... 264 0 0

For sanitary improvements, bath-room, and decoration, at Stanholm House, Edenbridge, for Mr. J. Stanford. Mr. M. Lawrence Caley, architect:—

Beale & Son	£309 0 0
E. Smith	298 0 0
E. Mackness (accepted)	271 0 0

For building four cottages, with drainage complete, for Mr. Frank Holmden, Edenbridge. Mr. M. Lawrence Caley, architect:—

J. J. Wise	£850 0 0
E. Mackness	830 0 0
Dires & Co.	790 0 0
Beale & Son	780 0 0
O. Goodwin	748 0 0
H. Elwig	740 0 0
Head Bros.	693 0 0
R. Jordan, jun. (accepted)	675 0 0

For external improvements to Marlpit House, Edenbridge, for Mr. Frank Holmden. Mr. M. Lawrence Caley, architect:—

R. Jordan, jun.	£184 0 0
E. Mackness	168 10 0
O. Goodwin (accepted)	120 0 0

For new Board schools, King and Queen-street, East-street, Walworth. Mr. E. R. Robson, architect. Quantities by Mr. W. H. Barber:—

Wall Bros.	£14,024 0 0
J. T. Chappell	13,383 0 0
Higgs & Hill	13,360 0 0
Stimpson & Co.	13,320 0 0
B. E Nightingale	13,237 0 0
G. Marsland	13,165 0 0
T. Boyce	13,140 0 0
Gerrard	13,073 0 0
J. Grover	13,043 0 0
Atherton & Latta	13,000 0 0
W. Oldrey	12,794 0 0
W. Downs	12 737 0 0
Kirk & Randall	12,674 0 0

For enlargement of Drury-lane Board School. Mr. E. R. Robson, architect. Quantities by Mr. C. Brooks:—

Boyce	£7,193 0 0
L. H. & R. Roberts	6,529 0 0
W. Oldrey	6,448 0 0
Pritchard	6,436 0 0
Downs	6,376 0 0
Perry & Co.	6,301 0 0
W. Brass	6,097 0 0
Williams & Son	5,973 0 0
Kirk & Randall	5,962 0 0
Nightingale	5,951 0 0
J. Grover	5,847 0 0

For warehouses, St. Mary Overy's Wharf, London Bridge, for Mr. George Doo. Mr. Geo. A. Dunnage, architect. Quantities by Messrs. Linsdell & Gifford:—

Higgs & Hill	£26,440 0 0
Burman	25,963 0 0
Patrick & Son	25,750 0 0
Brass	25,075 0 0
Conder	24,980 0 0
Holland & Hannen	23,923 0 0
Greenwood Bros.	22,893 0 0
Chafen	22,100 0 0
Kirk & Randall	21,310 0 0
Adamson & Son	21,300 0 0
Perry & Co.	20,616 0 0

For Free Library, Oldham. Mr. Thomas Mitchell, architect:—

Crowther Bros., Oldham	£10,829	0	0
Brown, Salford	10,400	0	0
Meadows, Stockport	9,860	0	0
Wood, Bootle	9,740	0	0
Dodd, Oldham	9,609	0	0
Schofield & Co., Oldham	9,550	0	0
Lees, Oldham	9,500	0	0
Herd, Manchester	9,387	0	0
Peters, Rochdale (accepted)	8,799	0	0

For re-building the White Horse Tavern, Poole Park Estate, Parson's-green, Fulham, for Mr. W. Chapley. Mr. George Treacher, architect:—

John Beale,* Westminster Bridge-road	£2,493	0	0

* Accepted.

Gas Fittings.

W. Nunn, Borough (accepted).

For new roads, sewers, and surface-water drains, at Hornsey, for the British Land Company. Mr. Henry B. Michell, surveyor:—

Peill & Sons, Bromley (accepted)	£4,579	3	5

For new roads, sewers, and surface-water drains, at Leyton, Essex, for Messrs. Meikle & Passmore:—

Jackson, Leyton (accepted)	£3,028	0	0

For the construction of road and drainage works, on the Lurgan Avenue Estate, Fulham, for the United Land Company:—

Wilson & Stodhard, Leyton	£739	0	0
John Ball, Chiswick	656	0	0
Rowles & Chapman, Acton	635	0	0
W. Harris, Southampton-street, S.E.	569	0	0
G. Felton, Kilburn Bridge, N.W.	547	0	0
Nowell & Robson, Kensington	545	0	0
Dyer & Huntley, Loughborough June.	528	0	0
Wilkes & Co., Devonshire-square	527	0	0
C. Lyon, Wandsworth	500	10	0
W. Nicholls, Wood-green	497	15	0
Tomes & Wimpey,* Hammersmith	453	0	0

* Accepted.

For alterations, repairs, and forming two new shop-fronts, at 162 and 164, Queen's-road, Bayswater. Messrs. Joseph & Pearson, architects:—

Langmead & Way	£1,673	0	0
Axford	1,597	0	0
Stimpson & Co.	1,513	0	0
Sawyer	1,494	0	0

For the erection of stables and other buildings, in Clareville-grove, West Brompton, for Mr. W. Follett. Mr. G. Edwards, architect:—

Niblett	£1,907	0	0
Craske	1,882	0	0
Lucas & Son	1,871	0	0
Higgingbottom	1,780	0	0
Scrivener & Co.	1,727	0	0
Stimpson & Co.	1,673	0	0
Green	1,604	0	0

For alterations, additions, and repairs to the Rectory, St. Barnabas Church, Addison-road, Kensington. Mr. W. Baker, architect. Quantities supplied:—

Dove Bros.	£2,275	0	0
W. Nash	2,240	0	0
Patman & Fotheringham	2,173	0	0
Lucas & Son	2,100	0	0
Adamson & Sons	2,050	0	0
C. Wall	1,985	0	0
Macey & Son	1,930	0	0
Stimpson & Co.	1,920	0	0
Johnson	1,890	0	0

For proposed alterations to 13, Lower Seymour-street, for Mr. C. Batt. Mr. Sancton Wood, architect:—

Saunders	£1,355	0	0
Stimpson & Co.	1,316	0	0
Higgs	1,195	0	0

For the erection of new training stables and trainer's house, at Exning, Newmarket, for the Earl of Zetland. Mr. F. Beeston, architect:—

	Stables.			House.		
Kinnimont & Sons	£9,344	0	0	£3,616	0	0
Grimwood	9,296	0	0	3,577	0	0
Reading & Son	7,870	0	0	3,710	0	0
Bell & Son	8,122	0	0	3,200	0	0
Green	8,182	0	0	3,075	0	0
Mason & Son	8,060	0	0	3,080	0	0
Stimpson & Co.	8,065	0	0	2,935	0	0
Wilkes Bros.	7,590	0	0	2,908	0	0

For laying down new granite carriageways and York-stone footways, in Camberwell-road and Church-street Camberwell, and High-street and Queen's-road, Peckham, and executing other works in connexion therewith, for the Metropolitan Board of Works. Sir J. Bazalgette, engineer:—

Hill & Co.	£24,537	0	0
J. J. Griffiths	22,295	0	0
Wheeler & Hindle	21,500	0	0
G. G. Rutty	21,229	0	0
Cooke & Co.	20,700	0	0
W. T. Hook	20,600	0	0
Nowell & Robson	20,498	0	0
Bottoms Bros.	19,970	0	0
Mowlem & Co.	19,488	0	0
Turner & Sons (accepted)	18,903	0	0

For additions, &c., to Railway-bridge over the Cheyair, Cuddapah, Madras, for the Madras Railway Company. Messrs. Sir John Hawkshaw, Son, & Hayter, engineers:—

Stanley, Hall, & Co. (accepted).

For the construction of storm-water sewers, in London-road and St. James's road, Leicester, for the Corporation. Mr. J. Gordon, C.E., Borough Surveyor and Engineer:—

J. Hutchinson & Son, Leicester	£575	0	0
John Lee & Co., Leicester	518	0	0
G. Cowdery & Sons, Newent	495	3	3
H. Hilton, Birmingham	471	18	0
J. Smart, Nottingham (accepted)	470	15	3

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All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

NOTICE TO SUBSCRIBERS.

THE INDEX and TITLE-PAGE for Volume XLI. (July to December, 1881), was given as a Supplement with the issue of January 14th last.

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